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PICTORIAL KEYS TO ARTHROPODS, REPTILES, BIRDS AND MAMMALS OF PUBLIC HEALTH SIGNIFICANCE

National Communicable Disease Center
Atlanta, Georgia

June 1969

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PICTORIAL KEYS

ARTHROPODS, REPTILES, BIRDS AND MAMMALS OF PUBLIC HEALTH SIGNIFICANCE

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197

PICTORIAL KEYS TO

ARTHROPODS, REPTILES, BIRDS AND MAMMALS

OF PUBLIC HEALTH SIGNIFICANCE

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION
NATIONAL COMMUNICABLE DISEASE CENTER
ATLANTA, GEORGIA 30333

I

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PUBLIC HEALTH SIGNIFICANCE OF GROUPS INCLUDED IN THE KEY

COMMON NAME	*PUBLIC HEALTH SIGNIFICANCE*
Ant	bite, sting; infest stored food; damage wood.
Bat	associated with rabies, histoplasmosis and many other diseases.
Bed Bug	cause dermatitis; not known to transmit disease.
Bee, Hornet, etc.	bite and sting; infest stored food; damage wood.
Beetle	infest stored food; infest human intestine; cause dermatitis.
Bird	associated with histoplasmosis, ornithosis and many other diseases.
Book Louse, Psocid	infest stored food.
Caterpillar	sting; infest intestinal tract.
Centipede	venomous bite; infest nasal, intestinal, and urinary tracts.
Chewing Louse	infest domestic birds and mammals.
Cockroach	transmit enteric diseases.
Collembola	infest stored food; used as indicator organisms for pesticide studies.
Copepod	involved in transmission of broad fish tapeworm and guinea worm.
Daddy Long-leg Spider	infest houses; harmless.
Earwig	household pests.
Flea	cause dermatitis; transmit plague, murine typhus, tapeworms.
Fly	some bite; larvae infest human flesh; transmit typhoid, paratyphoid, cholera, bacillary dysentery, infantile diarrhea, amebic dysentery, giardiasis, helminths, trachoma, conjunctivitis, yaws, anthrax, tularemia, African sleeping sickness, leishmaniasis, onchocerciasis, loiasis, bartonellosis, sandfly fever.
Ked or Louse Fly	occasionally bite man.
Kissing Bug	transmit Chagas disease.
Lagomorph	transmit tularemia and many other diseases.
Lobster, Crab, etc.	involved in transmission of oriental lung fluke.
Millipede	exude vesicating venom; infest digestive and urinary tract; intermediate host of tapeworms.
Mite	cause dermatitis; infest human intestine; transmit scrub typhus, rickettsialpox, epidemic hemorrhagic fever.
Mosquito	transmit malaria, encephalitis, yellow fever, dengue, filariasis.
Moth or Butterfly	infest stored food; infest human intestine; some have stinging hairs.
Pseudoscorpion	infest houses; harmless.
Rodent	transmit leptospirosis, lymphocytic choriomeningitis, etc.
Scorpion	sting.
Sea Spider	appearance causes fear; harmless.
Silverfish, Firebrat	infest stored food; transmit enteric diseases.
Snake	venomous bite; secondary infection of bites.
Sowbug, Pillbug	household pests; harmless.
Spider	venomous bite.
Sucking Louse	cause dermatitis; transmit epidemic typhus, trench fever, relapsing fever.
Sun Spider	non-venomous bite.
Termite	destroy wood; housing deterioration.
Thrips	bite man occasionally.
Tick	cause dermatitis, tick paralysis; transmit spotted fever, relapsing fever, tularemia, Colorado tick fever, Russian spring-summer encephalitis.
Whip Scorpion	appearance causes fear; harmless.

INTRODUCTION

Public health biologists are often responsible for teaching animal identification to personnel (sanitarians, engineers, physicians, veterinarians, etc.) without special training in taxonomy. One of the most successful devices for such training has been the pictorial key. The first U.S. Public Health Service pictorial key was devised by Stanley B. Freeborn and Eugene J. Gerberg (1943) to guide personnel in the identification of anopheline mosquito larvae during our national malaria control program.

After the Communicable Disease Center was founded (1946), additional keys were developed. At present the Center utilizes more than 75 such keys in its regular training program. These are the major items incorporated into this booklet. Apropos morphological diagrams are also included.

Precise identification of disease vectors is essential to their efficient control. In using the following keys it should be remembered that only a few of them include all species in a group, and that determinations made using them are only tentative.

The pictorial keys are typical of identification keys found in reference works and scientific papers except that they are arranged as diagrams and are illustrated. After making the first choice offered at the top of each page, follow the black lines or indicated numbers to secondary choices until the correct identification has been made. Note that, in some cases, the identification can be made in the first choice.

Note: The differing formats and typography in this publication were deliberately selected to:

(1) Provide a broad spectrum of taxonomic experience;

(2) Avoid the stultifying effect of monotonous repetition.

●2

ARTHROPODS OF PUBLIC HEALTH IMPORTANCE: KEY TO COMMON CLASSES AND ORDERS

Harold George Scott and Chester J. Stojanovich

1. Three or 4 pairs of walking legs (Fig. 1 A & B)..2

Five or more pairs of walking legs (Fig. 1 C & D)..33

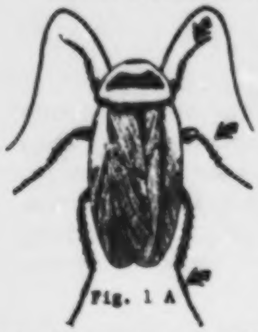


Fig. 1 A

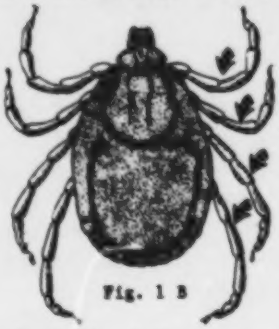


Fig. 1 B

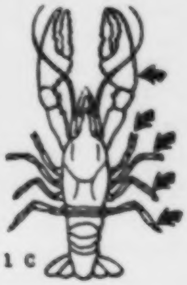


Fig. 1 C

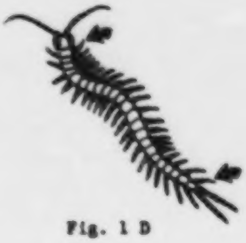


Fig. 1 D

2. Three pairs of walking legs (Fig. 2 A)..3

Four pairs of walking legs (Fig. 2 B)..25

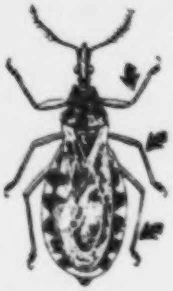


Fig. 2 A

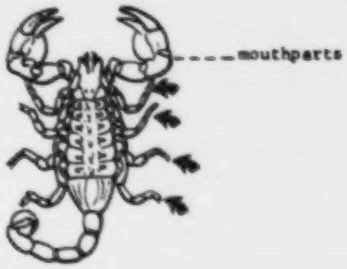


Fig. 2 B

3. Wings present, well developed (Fig. 3 A)..4

Wings absent or rudimentary (Fig. 3 B & C)..13

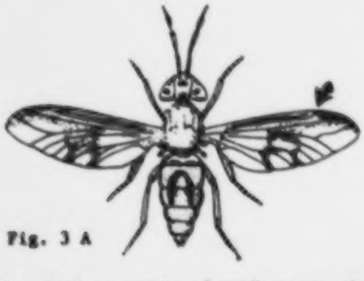


Fig. 3 A

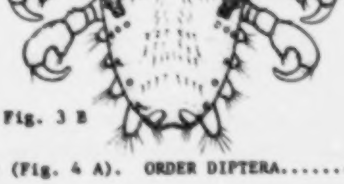


Fig. 3 B

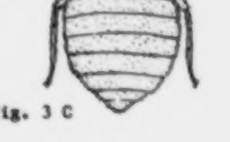


Fig. 3 C

4. With one pair of membranous wings (Fig. 4 A). ORDER DIPTERA..5

With two pairs of wings (Fig. 4 B & C)..6

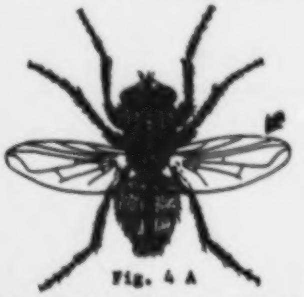


Fig. 4 A

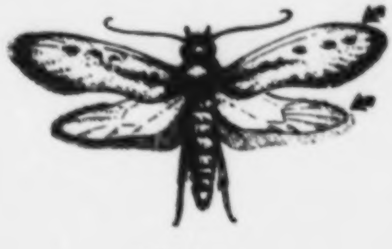


Fig. 4 B

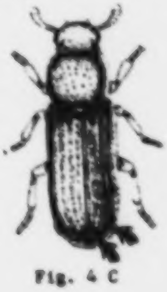


Fig. 4 C

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

5. Wings with scales (Fig. 5 A). FAMILY CULICIDAE..MOSQUITO

Wings without scales (Fig. 5 B). DIPTERA OTHER THAN MOSQUITOES..............................FLY

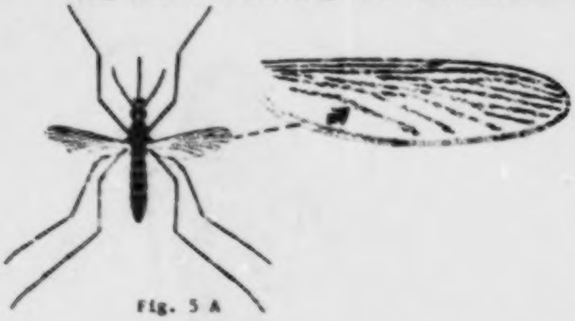


Fig. 5 A

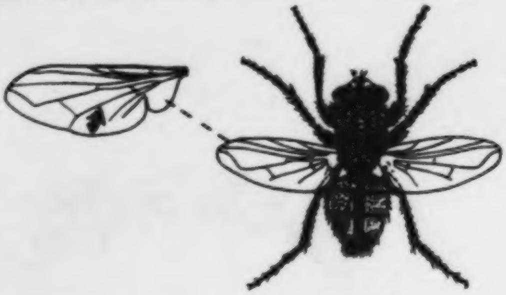


Fig. 5 B

6. Mouthparts adapted for sucking, with elongate proboscis (Fig. 6 A)..............................7

Mouthparts adapted for chewing, without elongate proboscis (Fig. 6 B)..............................9

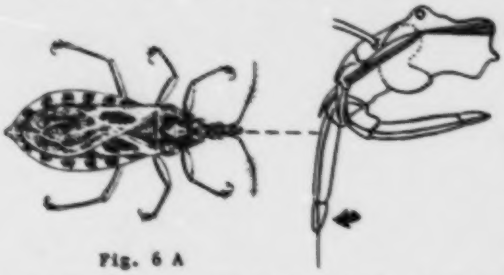


Fig. 6 A

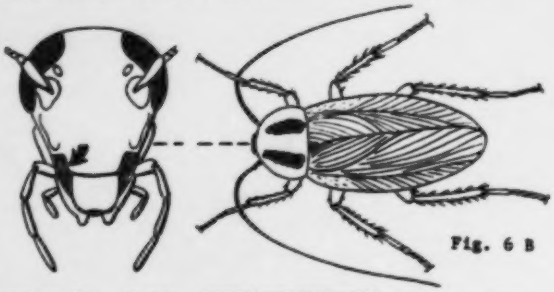


Fig. 6 B

7. Wings densely covered with scales; proboscis coiled (Fig. 7 A). ORDER LEPIDOPTERA...............
....MOTH OR BUTTERFLY

Wings not covered with scales; proboscis not coiled (Fig. 7 B)..................................8

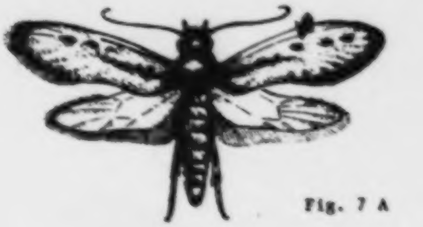


Fig. 7 A

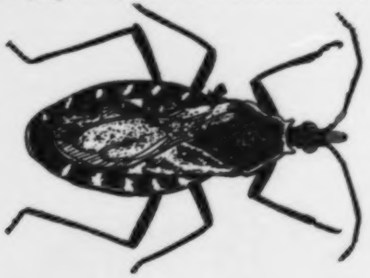


Fig. 7 B

8. Wing with fringe of long hair (Fig. 8 A). ORDER THYSANOPTERA...........................THRIPS

Wing without long hair (Fig. 8 B). ORDER HEMIPTERA..................................KISSING BUG

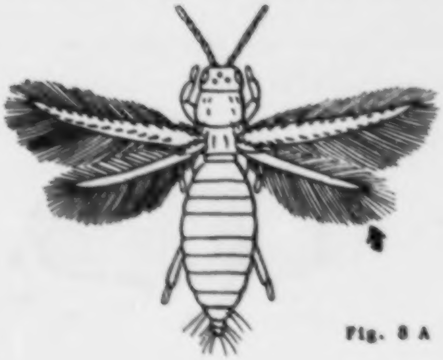


Fig. 8 A

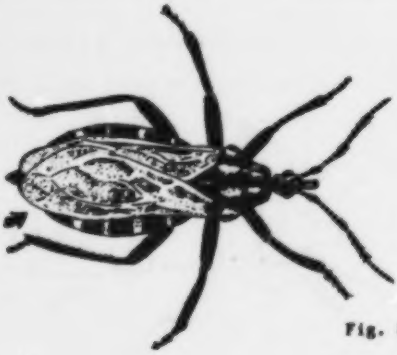


Fig. 8 B

9. Both pair of wings membranous and similar in structure (Fig. 9 A)....................................10

Front pair of wings shell-like or leathery, serving as covers for the second pair (Fig. 9 B)......11

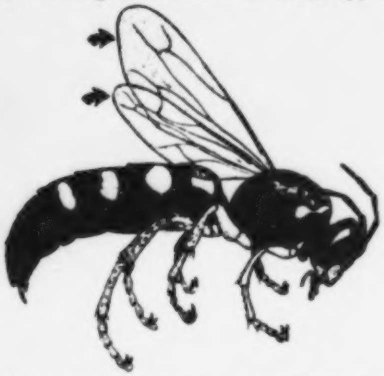


Fig. 9 A

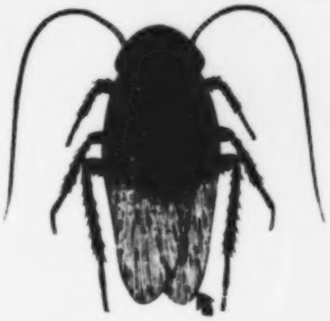


Fig. 9 B

10. Both pairs of wings similar in size (Fig. 10 A). ORDER ISOPTERA..............................TERMITE

Hind wing much smaller than front wing (Fig. 10 B). ORDER HYMENOPTERA...BEE, HORNET, WASP, YELLOW JACKET, OR ANT

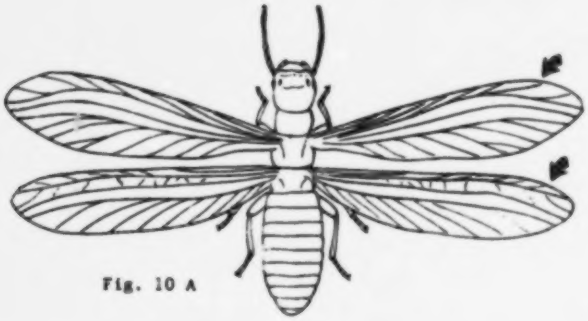


Fig. 10 A

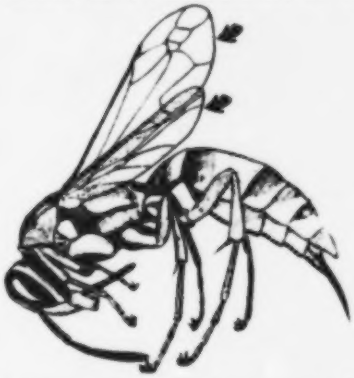


Fig. 10 B

11. Front wings horny or leathery, without distinct veins (Fig. 11 A)....................................12

Front wings leathery or paper-like, with distinct veins (Fig. 11 B). ORDER ORTHOPTERA.....COCKROACH

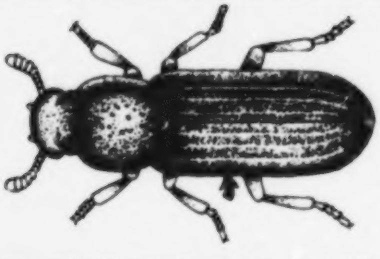


Fig. 11 A

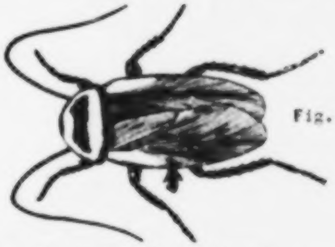


Fig. 11 B

12. Abdomen with prominent cerci; wings shorter than abdomen (Fig. 12 A). ORDER DERMAPTERA.......EARWIG

Abdomen without prominent cerci; wings covering abdomen (Fig. 12 B). ORDER COLEOPTERA........BEETLE

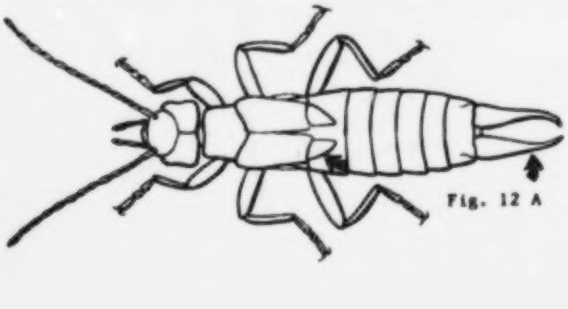


Fig. 12 A

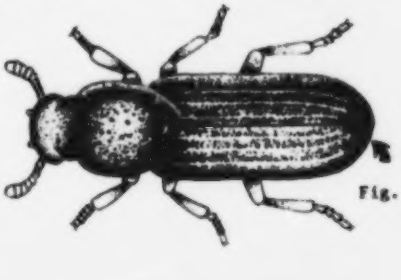


Fig. 12 B

13. Mouthparts with jaws for chewing (Fig. 13 A)..14

Mouthparts with a long beak or stylets for sucking up food (Fig. 13 B)..........................21

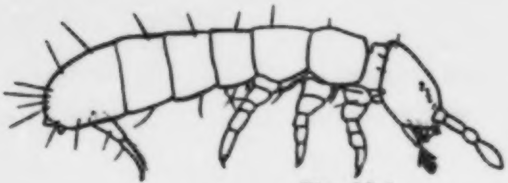


Fig. 13 A

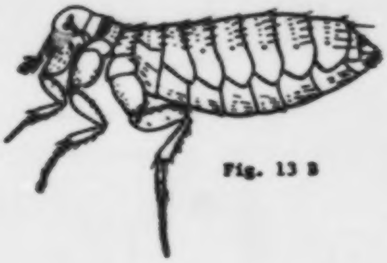


Fig. 13 B

14. With three long terminal tails (Fig. 14 A). ORDER THYSANURA..............SILVERFISH AND FIREBRAT

Without three long terminal tails (Fig. 14 B)....... 15

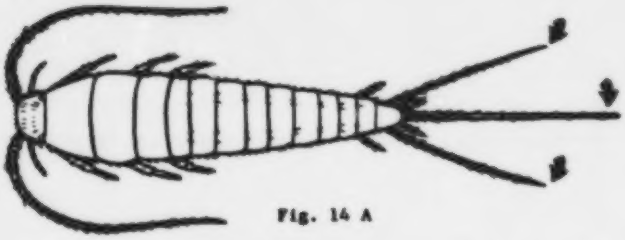


Fig. 14 A

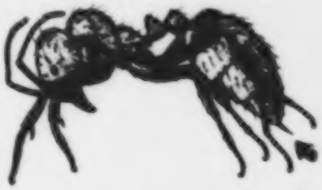


Fig. 14 B

15. Abdomen with prominent pair of cerci (Fig. 15 A). ORDER DERMAPTERA.......................EARWIG

Abdomen without prominent pair of cerci (Fig. 15 B)..16

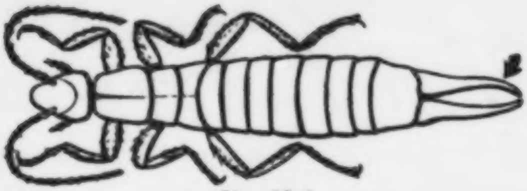


Fig. 15 A

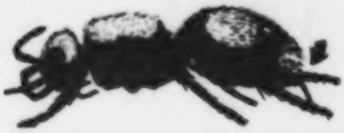


Fig. 15 B

16. With narrow waist (Fig. 16 A). ORDER HYMENOPTERA...ANT

Without narrow waist (Fig. 16 B)..17

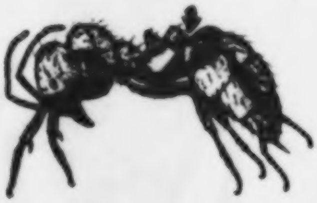


Fig. 16 A

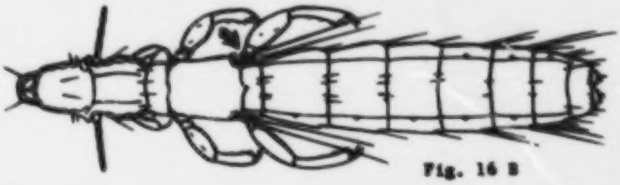


Fig. 16 B

17. Antenna with fewer than 8 segments (Fig. 17 A)..18

Antenna with more than 8 segments (Fig. 17 B)..19

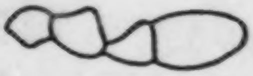


Fig. 17 A

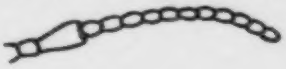


Fig. 17 B

18. Abdomen with 6 or fewer segments (Fig. 18 A). ORDER COLLEMBOLA.......................SPRINGTAIL

Abdomen with more than 6 segments (Fig. 18 B). ORDER MALLOPHAGA..................CHEWING LOUSE

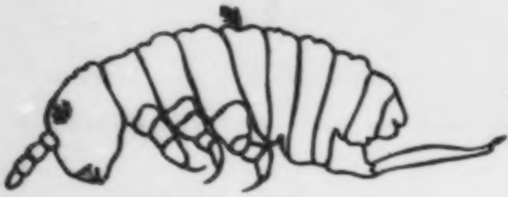


Fig. 18 A

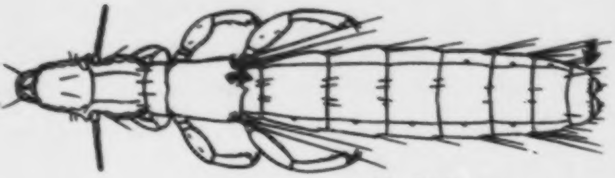


Fig. 18 B

19. Tarsus with 4-5 segments (Fig. 19 A)...20

Tarsus with 1-3 segments (fig. 19 B). ORDER PSOCOPTERA.....................BOOK LOUSE OR PSOCID

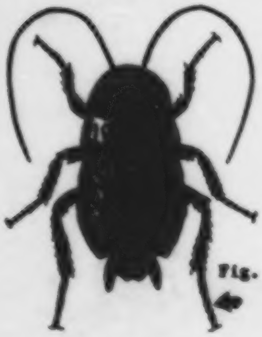


Fig. 19 A

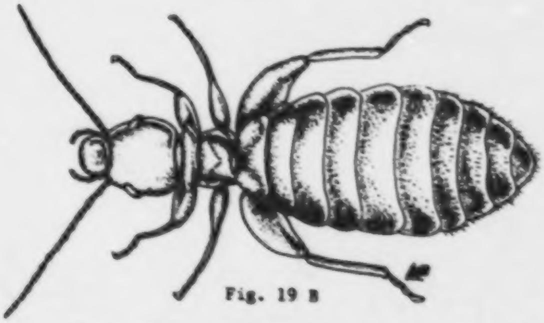


Fig. 19 B

20. Pronotum narrower than head, never covering head (Fig. 20 A). ORDER ISOPTERA...........TERMITE

Pronotum broader than head, often covering head (Fig. 20 B). ORDER ORTHOPTERA........COCKROACH

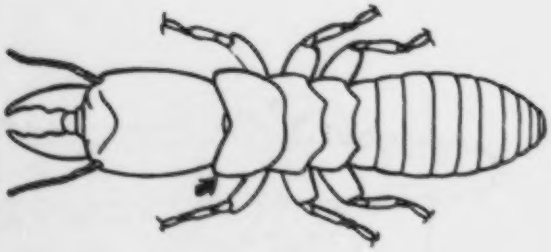


Fig. 20 A

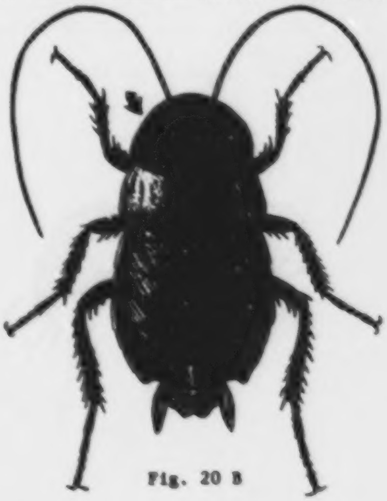


Fig. 20 B

21. Flattened laterally (Fig. 21 A). ORDER SIPHONATERA..FLEA

Flattened dorso-ventrally (Fig. 21 B)..22

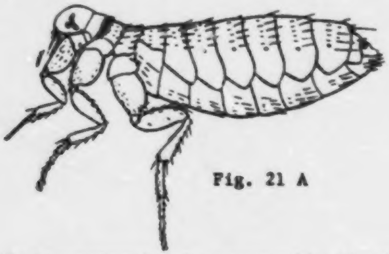


Fig. 21 A

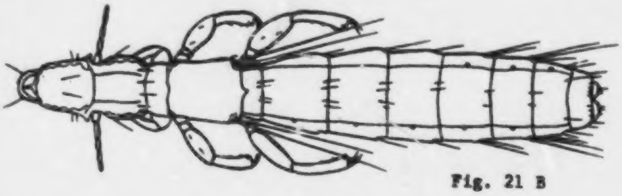


Fig. 21 B

22. Foot terminating in protrusible bladder (Fig. 22 A). ORDER THYSANOPTERA.................THRIPS

Foot not terminating in protrusible bladder (Fig. 22 B)..23

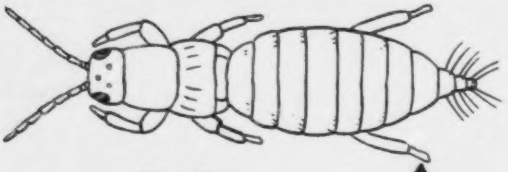


Fig. 22 A

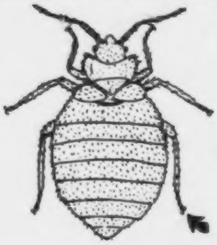


Fig. 22 B

23. Beak jointed (Fig. 23 A). ORDER HEMIPTERA..BEDBUG

Beak not jointed (Fig. 23 B)...24

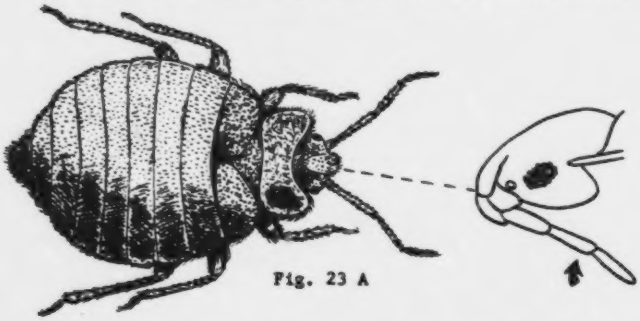


Fig. 23 A

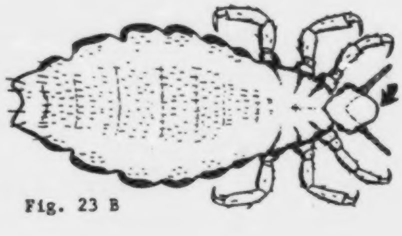


Fig. 23 B

24. Mouthparts retracted into head (Fig. 24 A). ORDER ANOPLURA.......................SUCKING LOUSE

Mouthparts not retracted into head (Fig. 24 B). ORDER DIPTERA.................KED OR LOUSE FLY

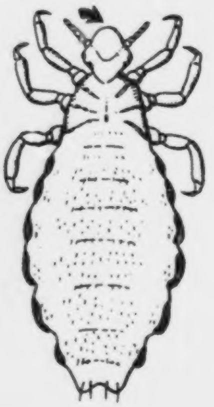


Fig. 24 A

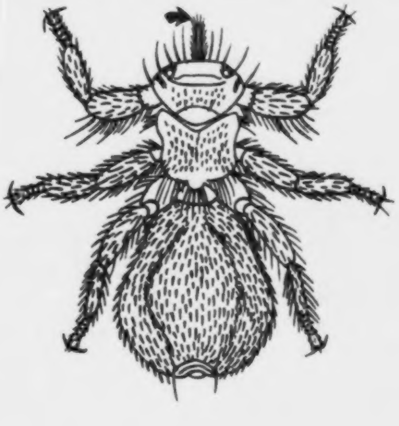


Fig. 24 B

25. Abdomen well-developed (Fig. 25 A). CLASS ARACHNIDA..26

Abdomen peg-like (Fig. 25 B). CLASS PYCNOGONIDA..................................SEA SPIDER

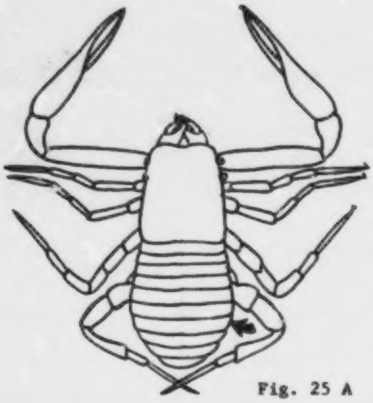


Fig. 25 A

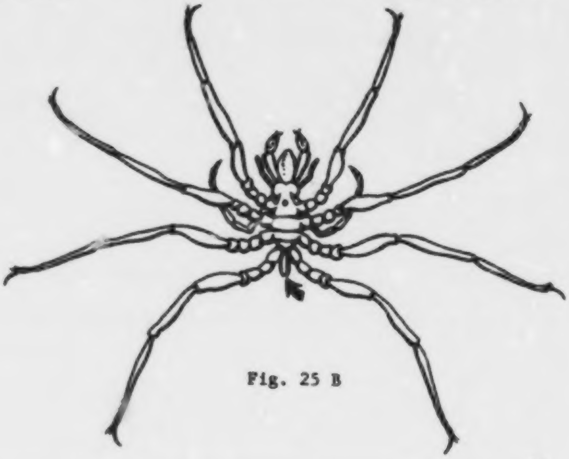


Fig. 25 B

26. Abdomen distinctly segmented (Fig. 26 A)..27

Abdomen not distinctly segmented (Fig. 26 B)..31

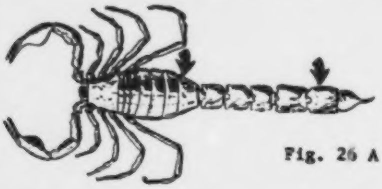


Fig. 26 A

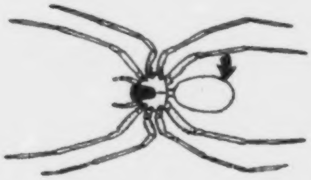


Fig. 26 B

27. Abdomen lengthened to form a long tail (Fig. 27 A)...28

Abdomen not lengthened to form a long tail (Fig. 27 B)......................................29

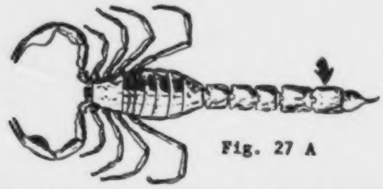


Fig. 27 A

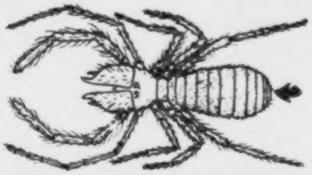


Fig. 27 B

28. Tail with stinger (Fig. 28 A). ORDER SCORPIONIDA......................................SCORPION

Tail without stinger (Fig. 28 B). ORDER PEDIPALPIDA..........................WHIP SCORPION

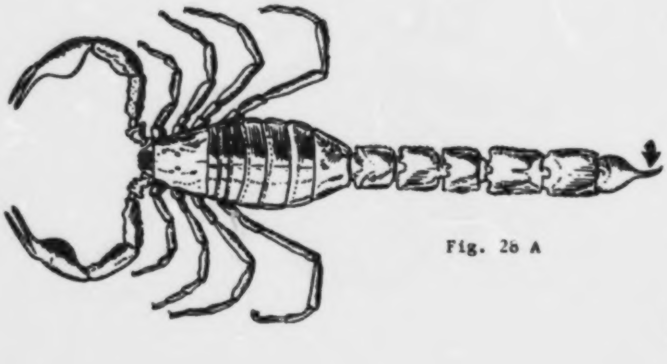


Fig. 28 A

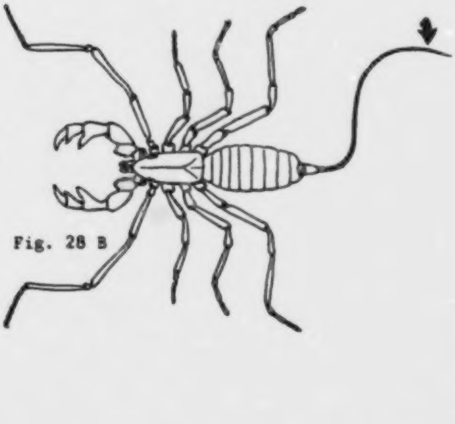


Fig. 28 B

29. With large pincer-like claws (Fig. 29 A). ORDER PSEUDOSCORPIONIDA...............PSEUDOSCORPION

Without large pincer-like claws (Fig. 29 B)...30

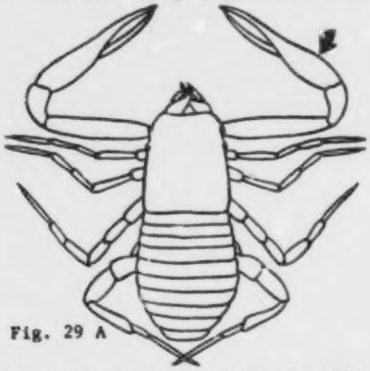


Fig. 29 A

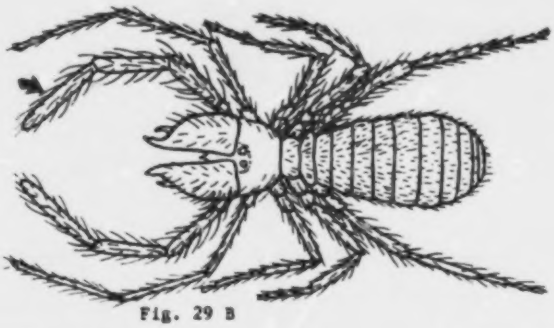


Fig. 29 B

30. Legs not longer than body (Fig. 30 A). ORDER SOLPUGIDA.................................SUN SPIDER

Legs much longer than body (Fig. 30 B). ORDER PHALANGIDA.................DADDY LONG-LEG SPIDER

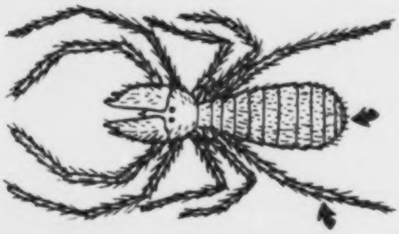


Fig. 30 A

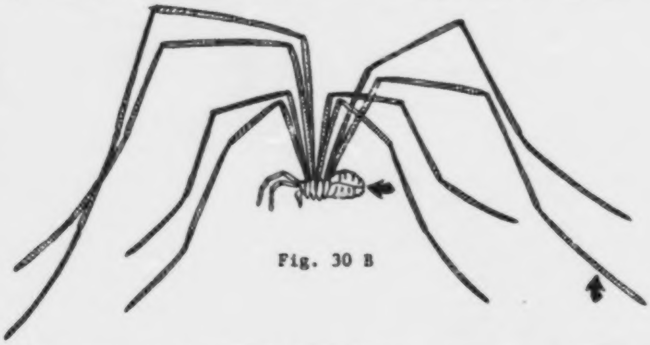


Fig. 30 B

31. Abdomen constricted to form a narrow waist (Fig. 31 A). ORDER ARANEIDA..................SPIDER

Abdomen not constricted (Fig. 31 B)..32

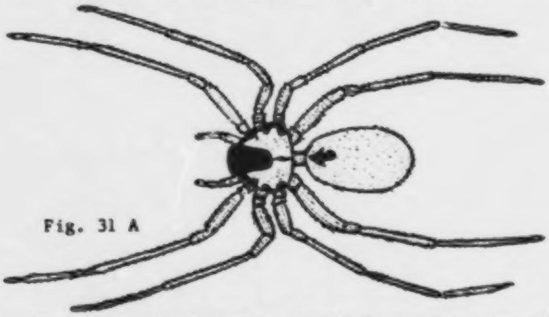


Fig. 31 A

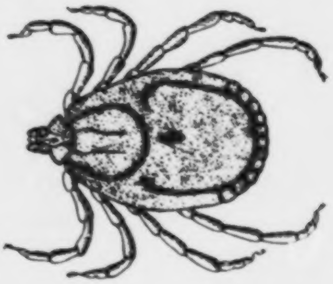


Fig. 31 B

32. Body with long hair; Haller's organ absent (Fig. 32 A). ORDER ACARINA.....................MITE

Body without hair or short hair; Haller's organ present (Fig. 32 B). ORDER ACARINA........TICK

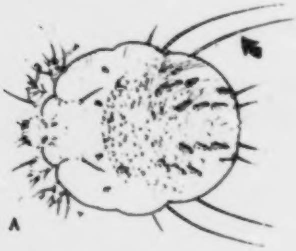


Fig. 32 A

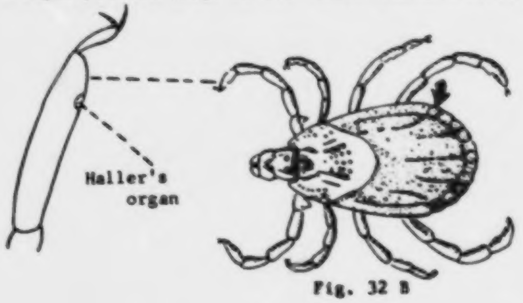


Fig. 32 B

33. Five to 7 pairs of walking legs (Fig. 33 A). CLASS CRUSTACEA....................................34

More than 14 pairs of walking legs (Fig. 33 B)..36

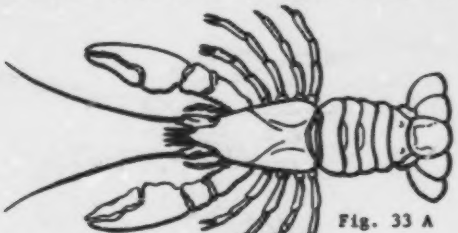


Fig. 33 A

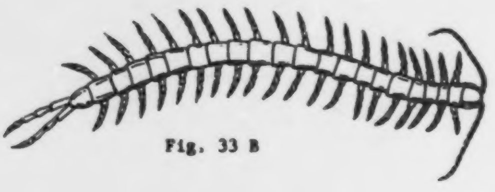


Fig. 33 B

34. Abdomen without appendages (Fig. 34 A). ORDER COPEPODA....................................COPEPOD

Abdomen with appendages (Fig. 34 B)..35

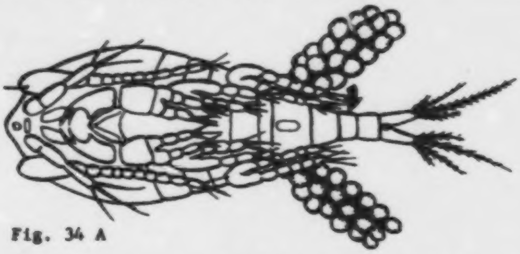


Fig. 34 A

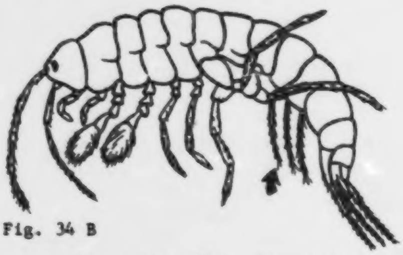


Fig. 34 B

35. Thorax covered with a fused plate; eyes, when present, on movable stalks (Fig. 35 A & B)...........
ORDER DECAPODA..LOBSTER, CRAB, CRAYFISH, SHRIMP, ETC.

Thorax not covered with a fused plate; eyes, when present, not on movable stalks (Fig. 35 C & D)...
ORDER ISOPODA...SOWBUG, PILLBUG

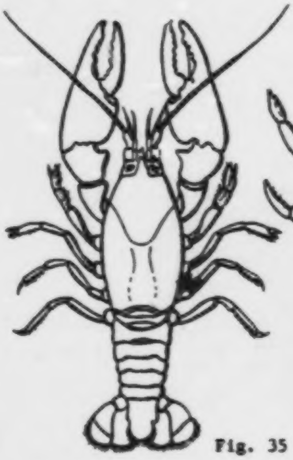


Fig. 35 A

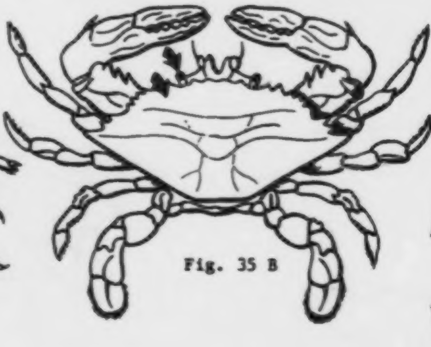


Fig. 35 B

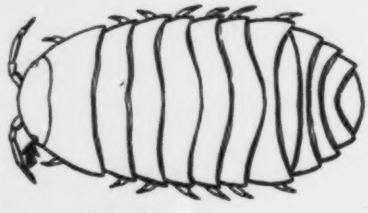


Fig. 35 C

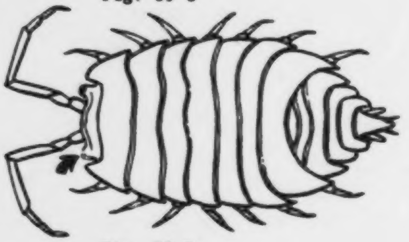


Fig. 35 D

36. One pair of legs per body segment (Fig. 36 A). CLASS CHILOPODA..........................CENTIPEDE

Two pairs of legs per body segment (Fig. 36 B). CLASS DIPLOPODA..........................MILLIPEDE

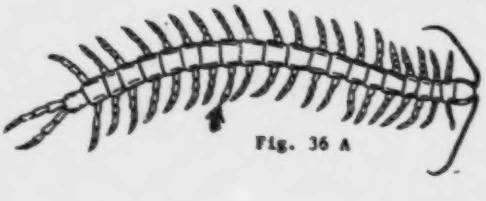


Fig. 36 A

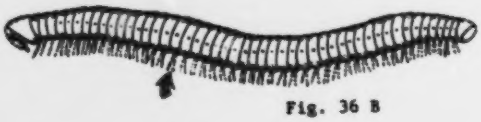
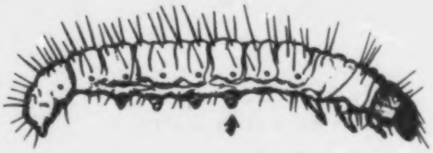


Fig. 36 B

HOUSEHOLD AND STORED-FOOD PESTS: PICTORIAL KEY TO COMMON LARVAE

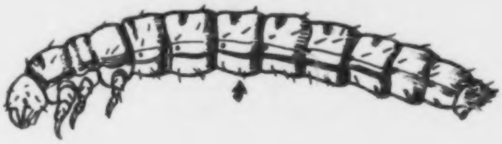
Chester J. Stojanovich & Harold George Scott

abdominal legs present

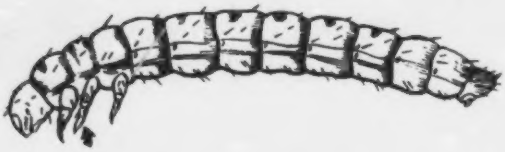


MOTH LARVAE

abdominal legs absent

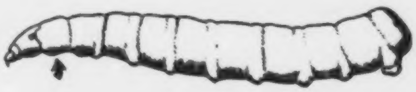


thoracic legs present

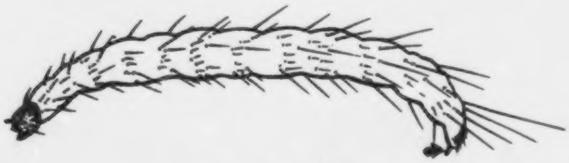


BEETLE, BORER & MEALWORM LARVAE

thoracic legs absent

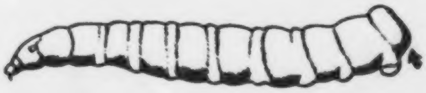


with fleshy lobes at ends of body

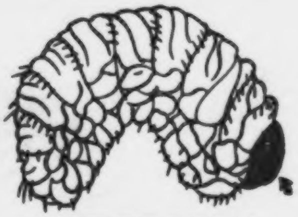


FLEA LARVAE

without fleshy lobes at ends of body

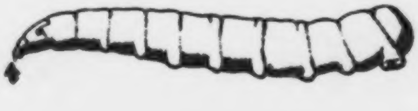


head capsule present



WEEVIL LARVAE

head capsule absent



MUSCOID FLY LARVAE

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch
Atlanta, Georgia 1962

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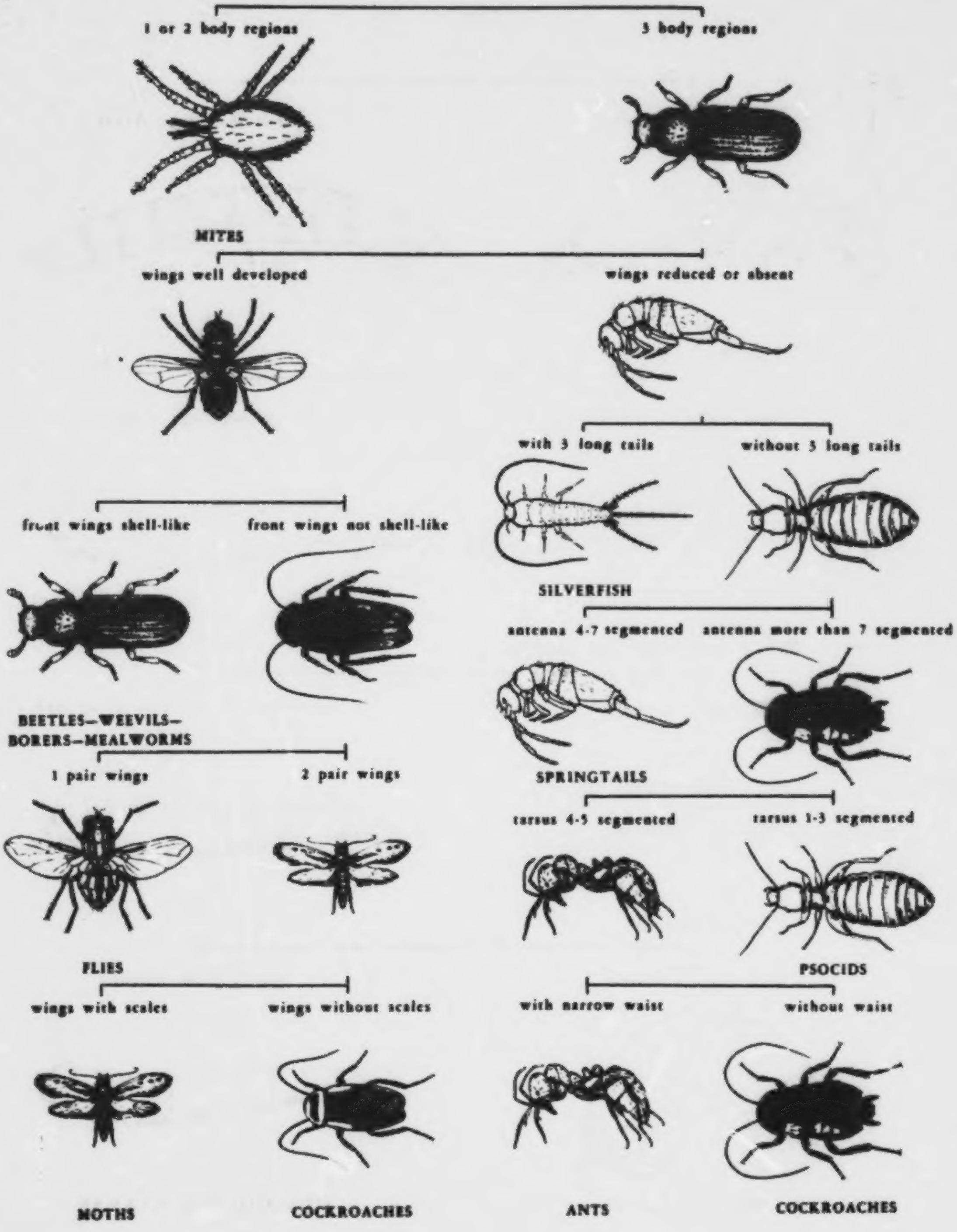
HOUSEHOLD AND STORED-FOOD PESTS: KEY TO COMMON ADULTS

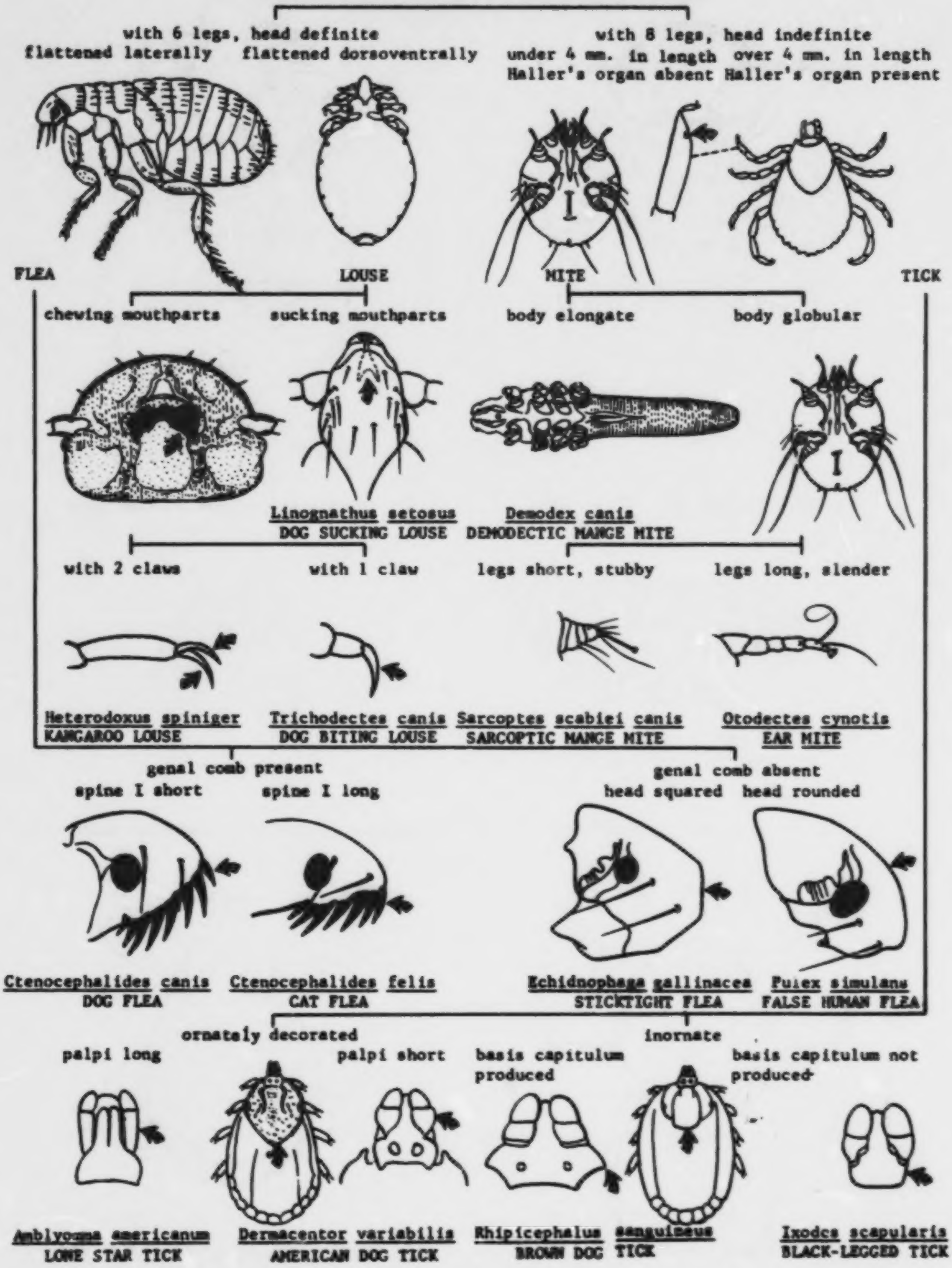
Harold George Scott & Chester J. Stojanovich


1 or 2 body regions
3 body regions
MITES
wings well developed
wings reduced or absent
with 3 long tails
without 3 long tails
SILVERFISH
front wings shell-like
front wings not shell-like
antenna 4-7 segmented
antenna more than 7 segmented
BEETLES—WEEVILS—BORERS—MEALWORMS
SPRINGTAILS
1 pair wings
2 pair wings
tarsus 4-5 segmented
tarsus 1-3 segmented
FLIES
PSOCIDS
wings with scales
wings without scales
with narrow waist
without waist
MOTHS
COCKROACHES
ANTS
COCKROACHES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia - 1962

ECTOPARASITES OF THE DOG: PICTORIAL KEY TO COMMON SPECIES

Harold George Scott & Chester J. Stojanovich


with 6 legs, head definite
flattened laterally
flattened dorsoventrally
with 8 legs, head indefinite
under 4 mm. in length
Haller's organ absent
over 4 mm. in length
Haller's organ present
FLEA
LOUSE
MITE
TICK
chewing mouthparts
sucking mouthparts
body elongate
body globular
Linognathus setosus
DOG SUCKING LOUSE
Demodex canis
DEMODECTIC MANGE MITE
with 2 claws
with 1 claw
legs short, stubby
legs long, slender
Heterodoxus spiniger
KANGAROO LOUSE
Trichodectes canis
DOG BITING LOUSE
Sarcoptes scabiei canis
SARCOPTIC MANGE MITE
Otodectes cynotis
EAR MITE
genal comb present
spine I short
spine I long
genal comb absent
head squared
head rounded
Ctenocephalides canis
DOG FLEA
Ctenocephalides felis
CAT FLEA
Echidnophaga gallinacea
STICKTIGHT FLEA
Pulex simulans
FALSE HUMAN FLEA
ornately decorated
palpi long
palpi short
inornate
basis capitulum produced
basis capitulum not produced
Amblyomma americanum
LONE STAR TICK
Dermacentor variabilis
AMERICAN DOG TICK
Rhipicephalus sanguineus
BROWN DOG TICK
Ixodes scapularis
BLACK-LEGGED TICK

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1965

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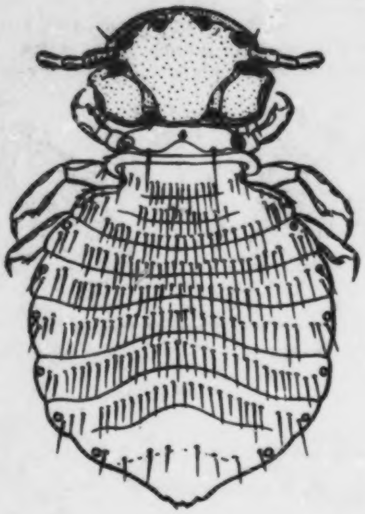
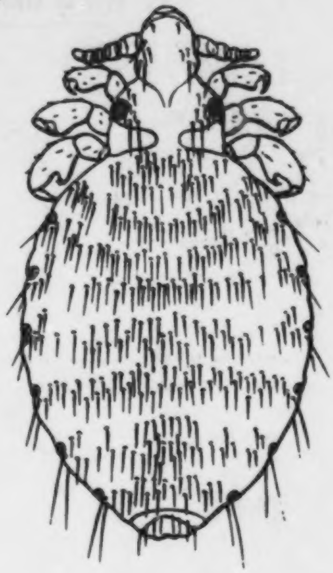
REPRESENTATIVE ECTOPARASITES OF THE DOG

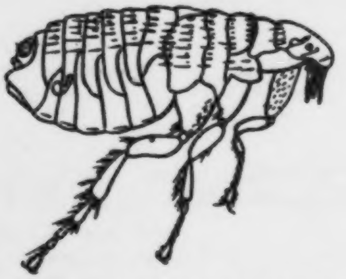
Chester J. Stojanovich



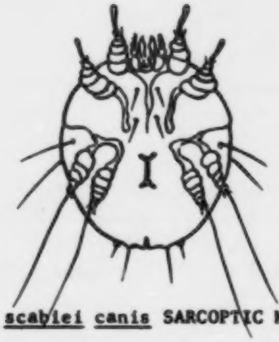
Trichodectes canis DOG BITING LOUSE



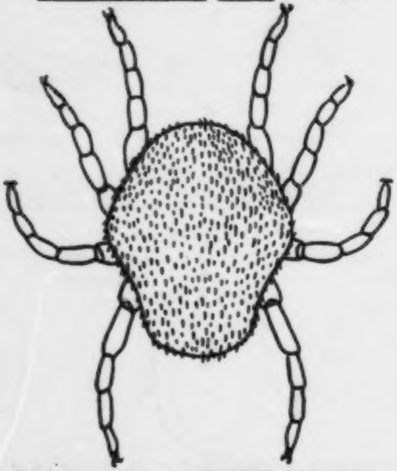
Linognathus setosus DOG SUCKING LOUSE



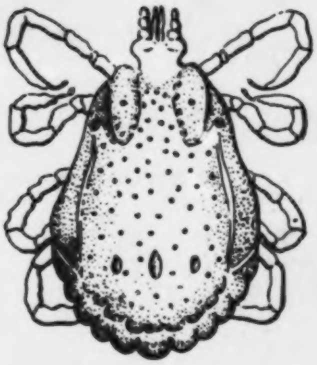
Ctenocephalides felis CAT FLEA



Sarcoptes scabiei canis SARCOPTIC MANGE MITE



Otobius megnini SPINOSE EAR TICK



Rhipicephalus sanguineus BROWN DOG TICK

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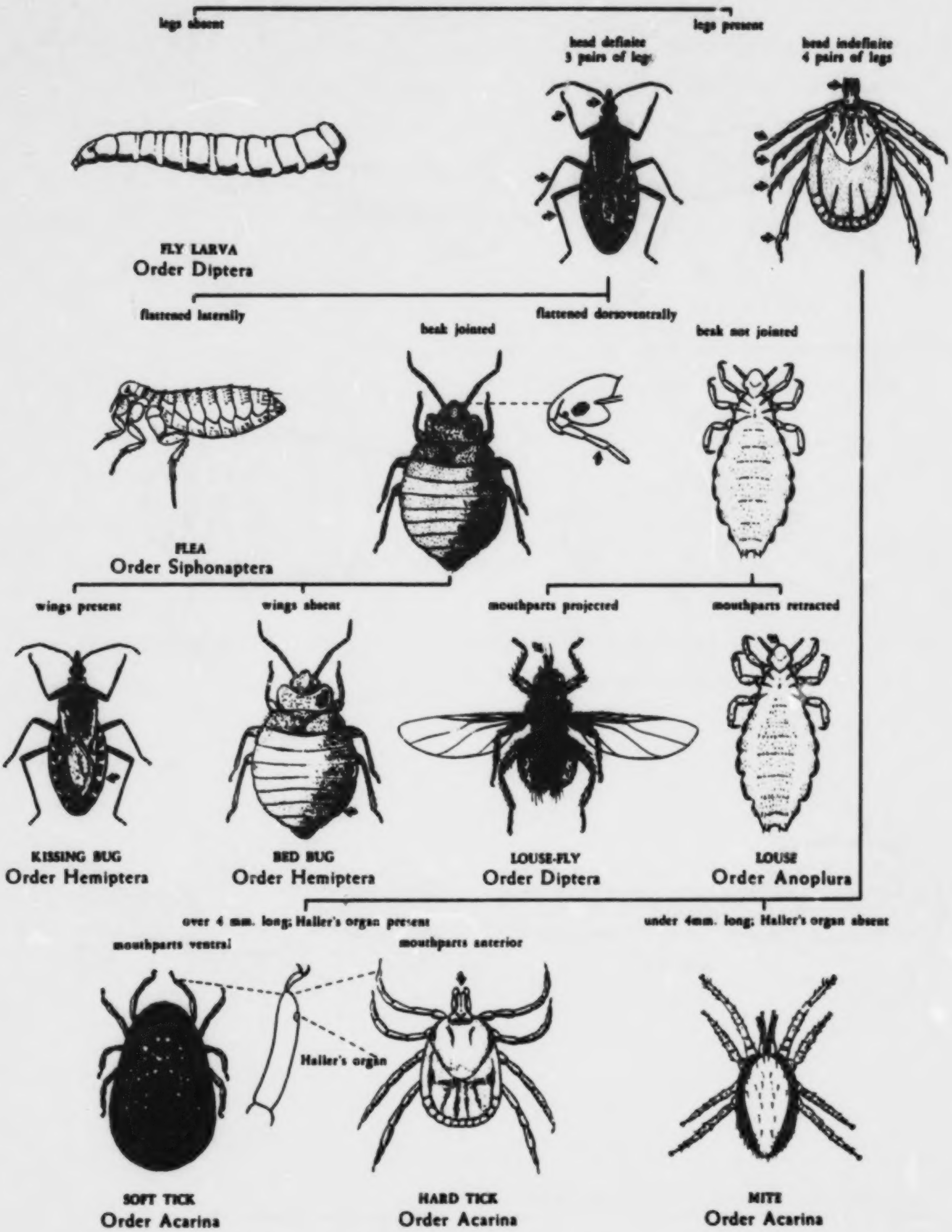
HUMAN ECTOPARASITES: KEY TO COMMON GROUPS

Chester J. Stojanovich and Harold George Scott


legs absent
legs present
head definite
3 pairs of legs
head indefinite
4 pairs of legs
FLY LARVA
Order Diptera
flattened laterally
flattened dorsoventrally
beak jointed
beak not jointed
FLEA
Order Siphonaptera
wings present
wings absent
mouthparts projected
mouthparts retracted
KISSING BUG
Order Hemiptera
BED BUG
Order Hemiptera
LOUSE-FLY
Order Diptera
LOUSE
Order Anoplura
over 4 mm. long; Haller's organ present
under 4mm. long; Haller's organ absent
mouthparts ventral
mouthparts anterior
Haller's organ
SOFT TICK
Order Acarina
HARD TICK
Order Acarina
MITE
Order Acarina

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

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CRUSTACEA: KEY TO SOME MAJOR ORDERS

Chester J. Stojanovich and Harold George Scott

1. With abdominal appendages (Fig. 1 A)..2

Without abdominal appendages (Fig. 1 B)...7

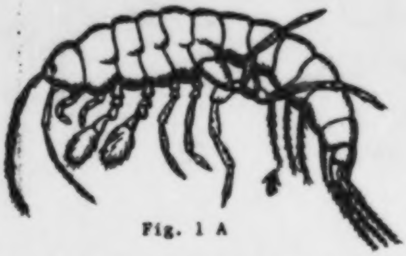

Fig. 1 A

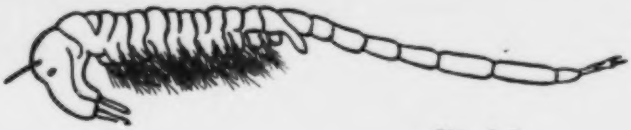

Fig. 1 B

2. Carapace present (Fig. 2 A)..3

Carapace absent (Fig. 2 B)...6

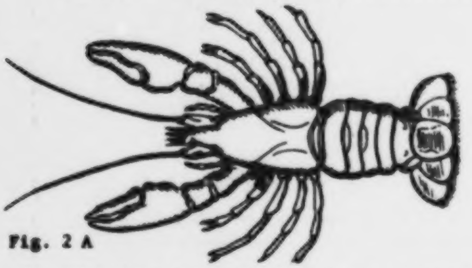

Fig. 2 A

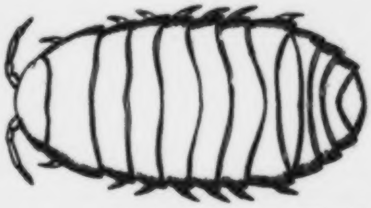

Fig. 2 B

3. With dorsal shield (Fig. 3 A). SHIELD SHRIMP........................Order NOTOSTRACA

Without dorsal shield (Fig. 3 B)..4

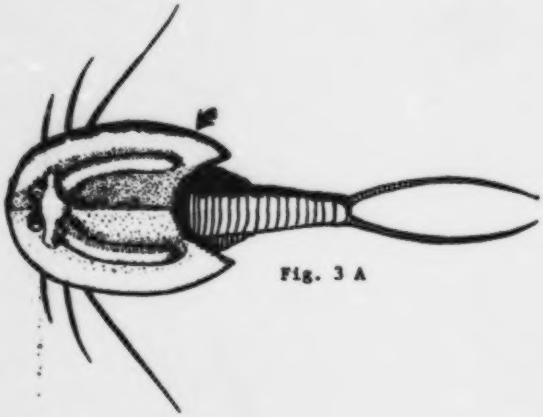

Fig. 3 A

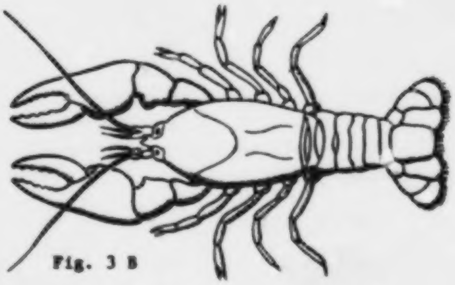

Fig. 3 B

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PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia - 1963

4. With bivalve shell (Fig. 4 A). SHELL SHRIMP.......................... Order CONCHOSTRACA

Without bivalve shell (Fig. 4 B)... 5

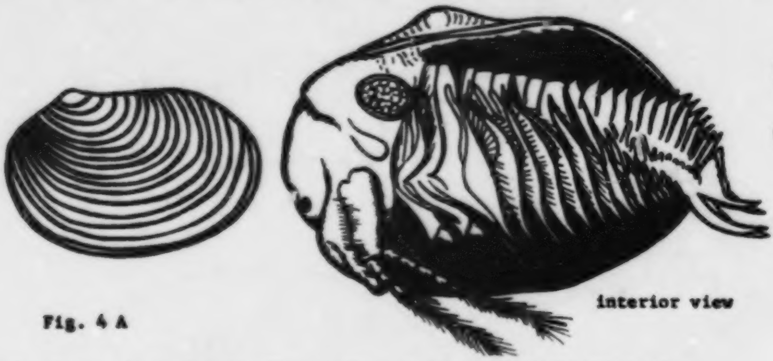


Fig. 4 A

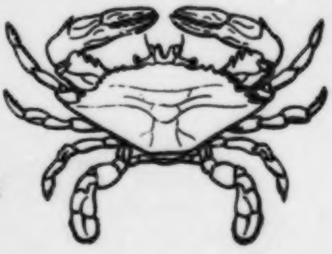


Fig. 4 B

5. First pleopod rudimentary (Fig. 5 A). OPOSSUM SHRIMP.................... Order MYSIDACEA

First pleopod well-developed (Fig. 5 B, C & D). SHRIMP, CRAYFISH, LOBSTERS, CRABS...... .... Order DECAPODA

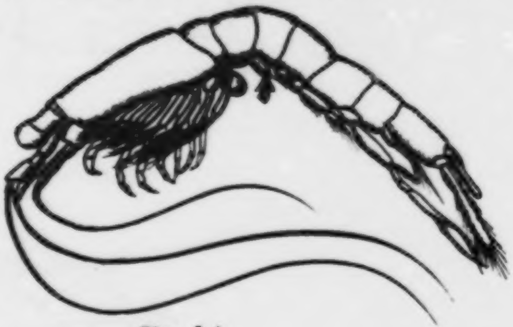


Fig. 5 A

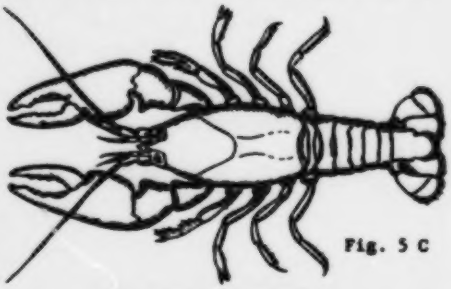


Fig. 5 C

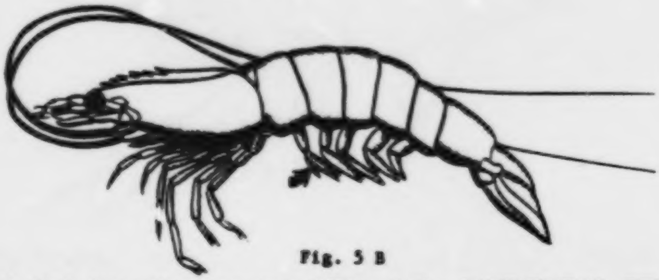


Fig. 5 B

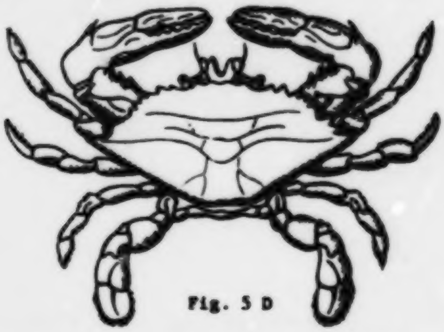


Fig. 5 D

6. Body laterally compressed (Fig. 6 A). SAND FLEAS, ETC.................. Order AMPHIPODA

Body dorso-ventrally compressed (Fig. 6 B). SOWBUGS, PILLBUGS, ETC........ Order ISOPODA

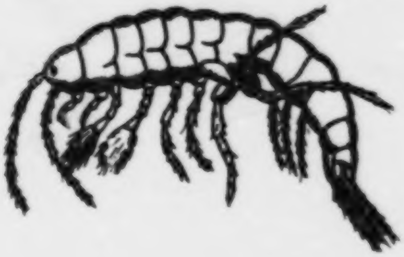


Fig. 6 A

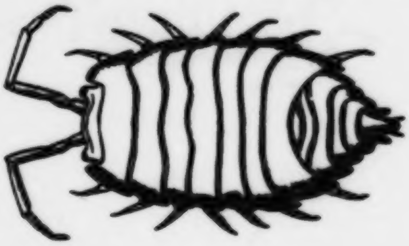


Fig. 6 A

7. Body not completely enlosed in a bivalve shell (Fig. 7 A)..................................8

Body completely enclosed in a bivalve shell (Fig. 7 B). OSTRACODS.......... Order PODOCOPA

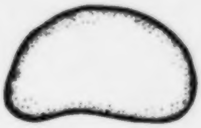


Fig. 7 B

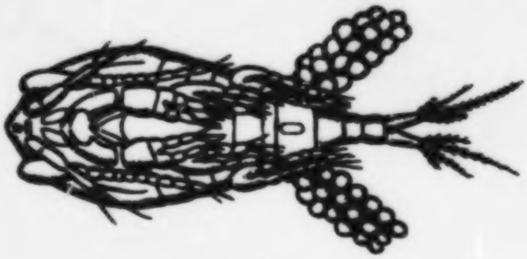
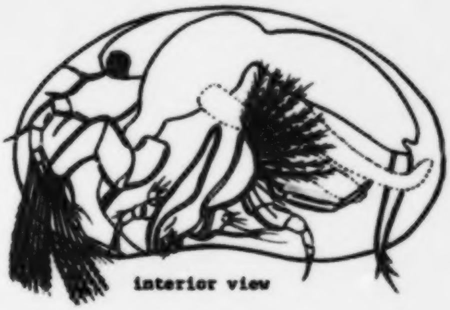


Fig. 7 A



interior view

8. Body segmented (Fig. 8 A)..9

Body not segmented (Fig. 8 B). WATER FLEAS...........................Order CLADOCERA

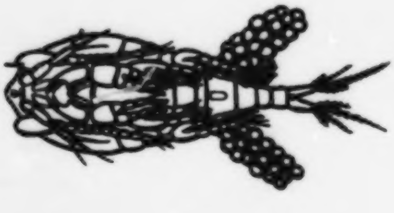


Fig. 8 A

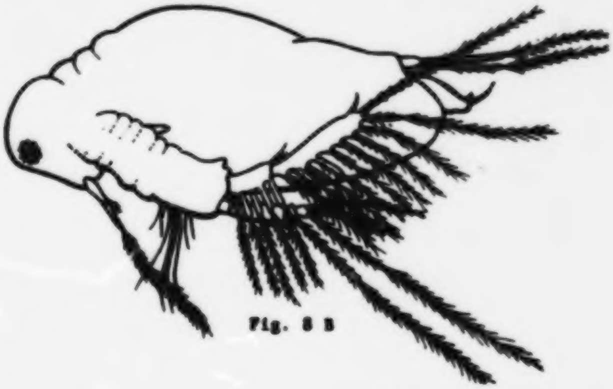


Fig. 8 B

9. Eyes stalked (Fig. 9 A). FAIRY SHRIMP...................................Order ANOSTRACA

Eyes not stalked (Fig. 9 B). COPEPODS...............................Order EUCOPEPODA

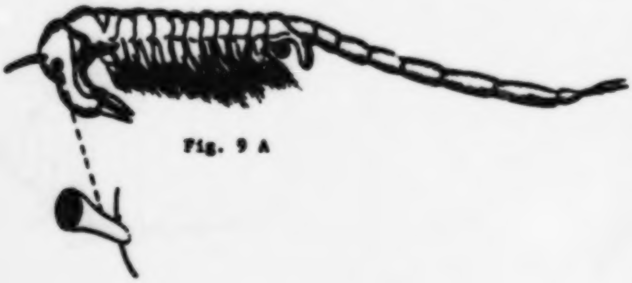


Fig. 9 A

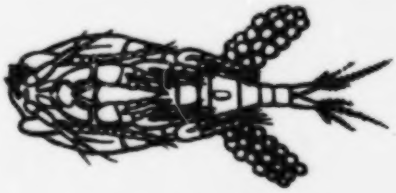
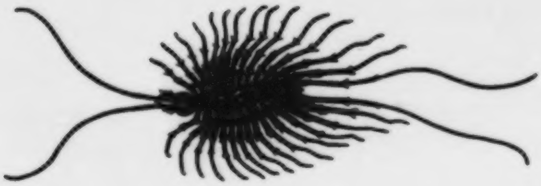


Fig. 9 B

CENTIPEDES: KEY TO SOME IMPORTANT UNITED STATES SPECIES

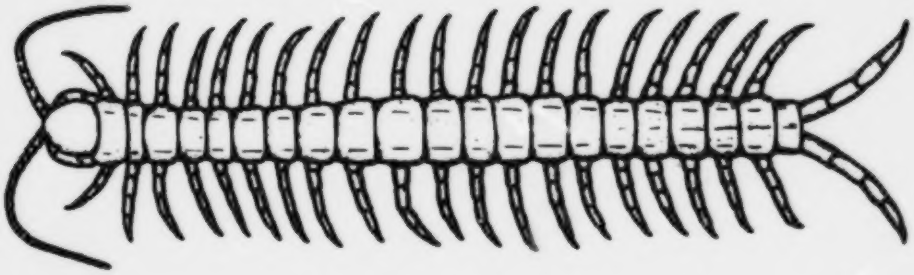
Harold George Scott

1. 8 dorsal plates: 15 pairs of long legs. . . . EASTERN HOUSE CENTIPEDE, *Scutigera cleoptrata*
   More than 14 dorsal plates. 2



Scutigera cleoptrata

2. 15 pairs of legs (*Lithobius*). 3
   21-23 pairs of legs (*Scolopendra*) 4
   More than 30 pairs of legs (*Geophilus*) 5
3. Antenna 19-23 segmented . . . .*Lithobius multidentatus*
   Antenna 33-43 segmented . . . . *Lithobius forficatus*
4. Anal legs as long as or longer than 3 terminal body segments. . . . .
   . . . . WESTERN HOUSE CENTIPEDE, *Scolopendra heros*
   Anal legs shorter than 3 terminal body segments . . . . *Scolopendra morsitans*



Scolopendra heros

5. 47-53 pairs of legs. 6
   64-67 pairs of legs. . . . . *Geophilus californicus*
6. With 2 longitudinal black lines . . . .*Geophilus rubens*
   Without longitudinal black lines . . . .*Geophilus umbraticus*

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#20

MILLIPEDES: KEY TO SOME IMPORTANT UNITED STATES SPECIES

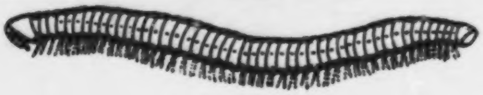
Harold George Scott, Ph.D.

1. 20-21 body segments 2

   More than 29 body segments 3

2. Legs with basal spines . . . . *Pleurolomia butleri* (= *Fontaria virginiensis*)

   Legs without basal spines . . . . *Pseudopolydesmus serratus*

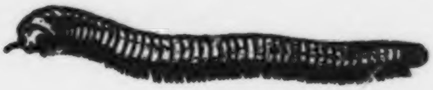


Narceus americanus

3. Body segment 3 with legs . . . . *Narceus americanus* (= *Spirobolus marginatus*)

   Body segment 3 without legs . . . . *Brachyiulus pusillus* (= *Julus virgatus*)

Brachyiulus pusillus



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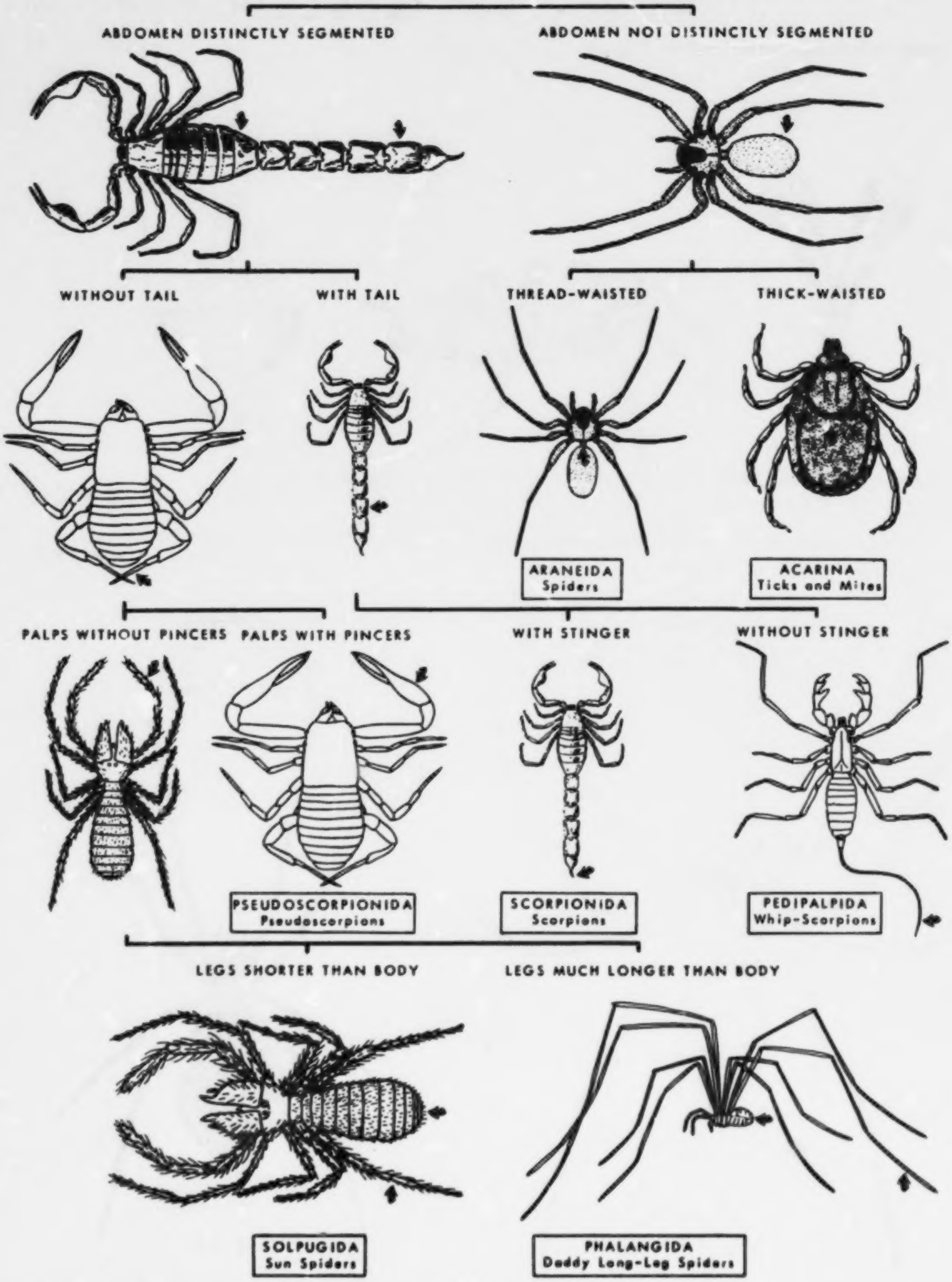
PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch
Atlanta, Georgia
1964

ARACHNIDA: KEY TO COMMON ORDERS OF PUBLIC HEALTH IMPORTANCE

Harold George Scott & Chester J. Stojanovich


ABDOMEN DISTINCTLY SEGMENTED
ABDOMEN NOT DISTINCTLY SEGMENTED
WITHOUT TAIL
WITH TAIL
THREAD-WAISTED
THICK-WAISTED
ARANEIDA
Spiders
ACARINA
Ticks and Mites
PALPS WITHOUT PINCERS
PALPS WITH PINCERS
WITH STINGER
WITHOUT STINGER
PSEUDOSCORPIONIDA
Pseudoscorpions
SCORPIONIDA
Scorpions
PEDIPALPIDA
Whip-Scorpions
LEGS SHORTER THAN BODY
LEGS MUCH LONGER THAN BODY
SOLPUGIDA
Sun Spiders
PHALANGIDA
Daddy Long-Leg Spiders

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SPIDERS: KEY TO SOME IMPORTANT UNITED STATES SPECIES

Harold George Scott & Chester J. Stojanovich

1. Fangs projecting horizontally (Fig. 1 A). (abdomen without tergites; tarsus with claw tufts and 2 claws) .... Dugesiella hentzi and others, TARANTULAS

   Fangs projecting vertically (Fig. 1 B). 2

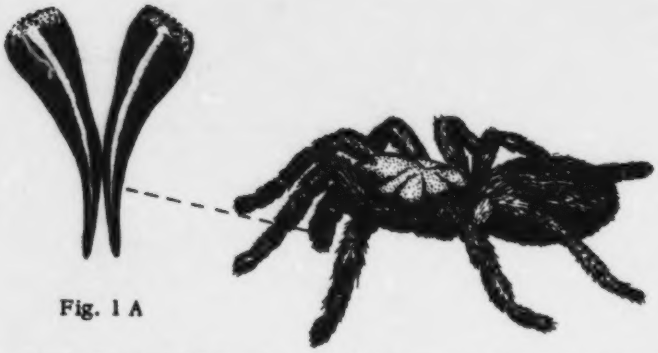

Fig. 1 A

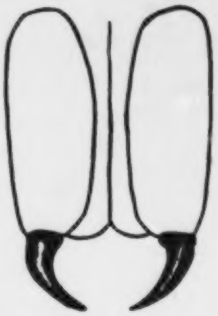

Fig. 1 B

2. Six eyes in 3 pairs; fiddle-shaped marking on cephalothorax (Fig. 2 A). ....
   Loxosceles reclusa. .... BROWN RECLUSE SPIDERS

   Eight eyes (shiny black with red spots; usually with red hourglass on underside of abdomen) (Fig. 2 B).
   Latrodectus mactans. .... BLACK WIDOW SPIDER

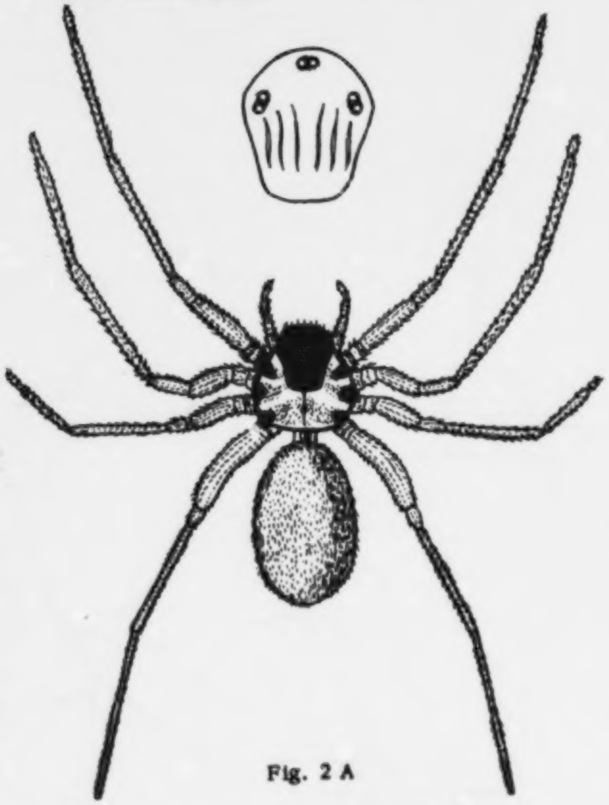

Fig. 2 A

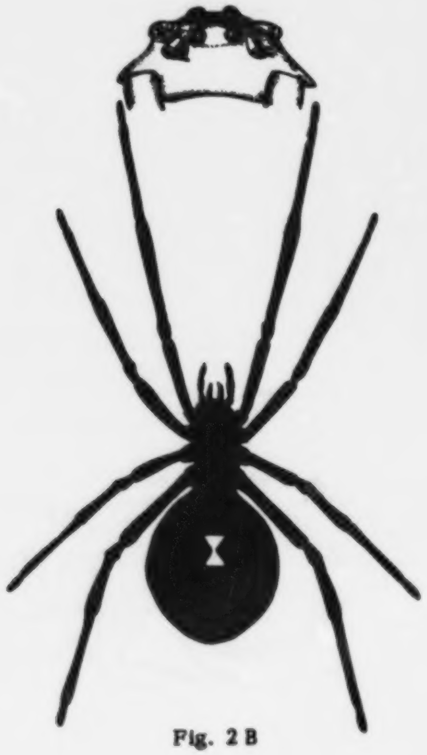

Fig. 2 B

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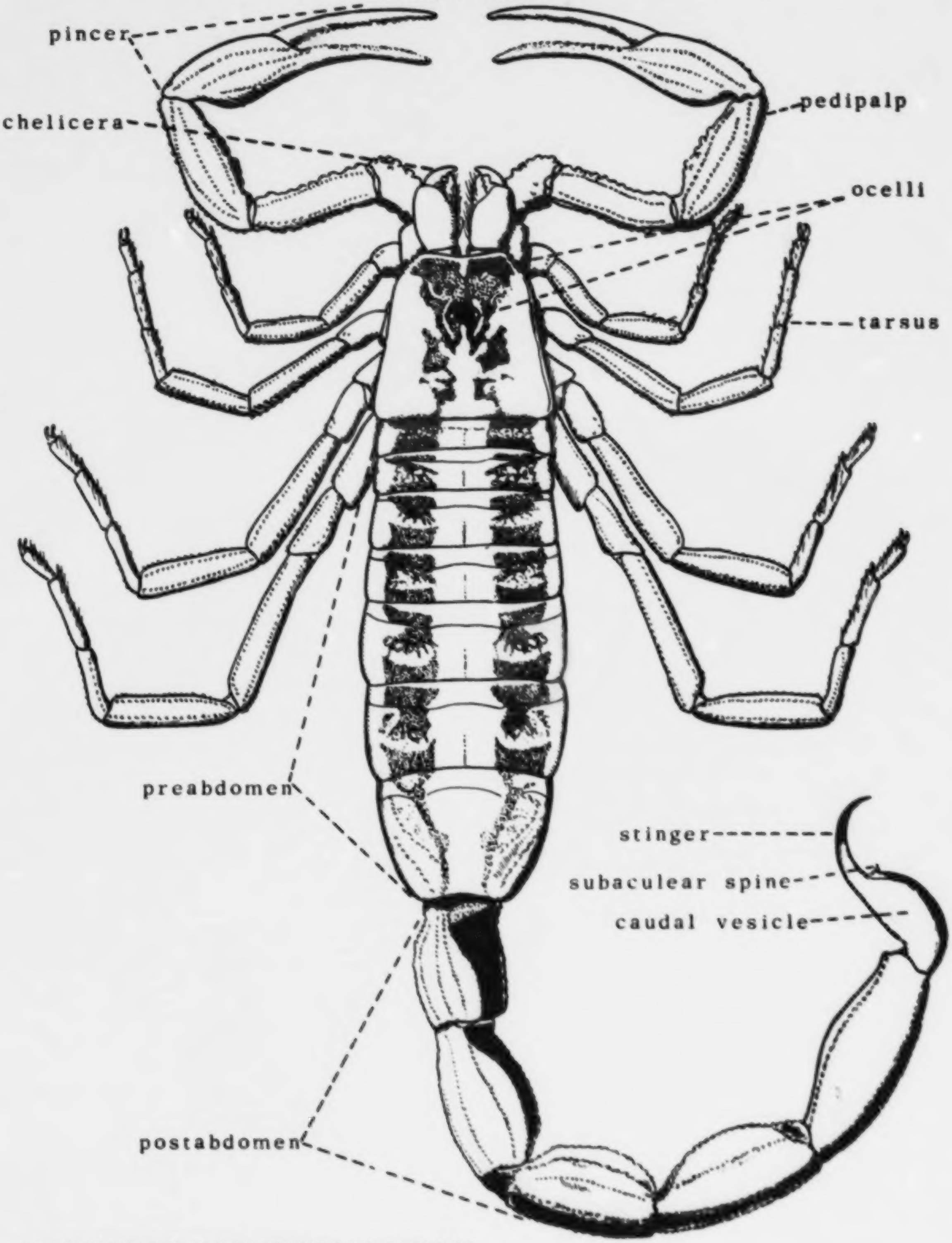
SCORPION DIAGRAM: DORSAL VIEW OF CENTRUROIDES VITTATUS

Chester J. Stojanovich


pincer
pedipalp
chelicera
ocelli
tarsus
preabdomen
stinger
subaculear spine
caudal vesicle
postabdomen

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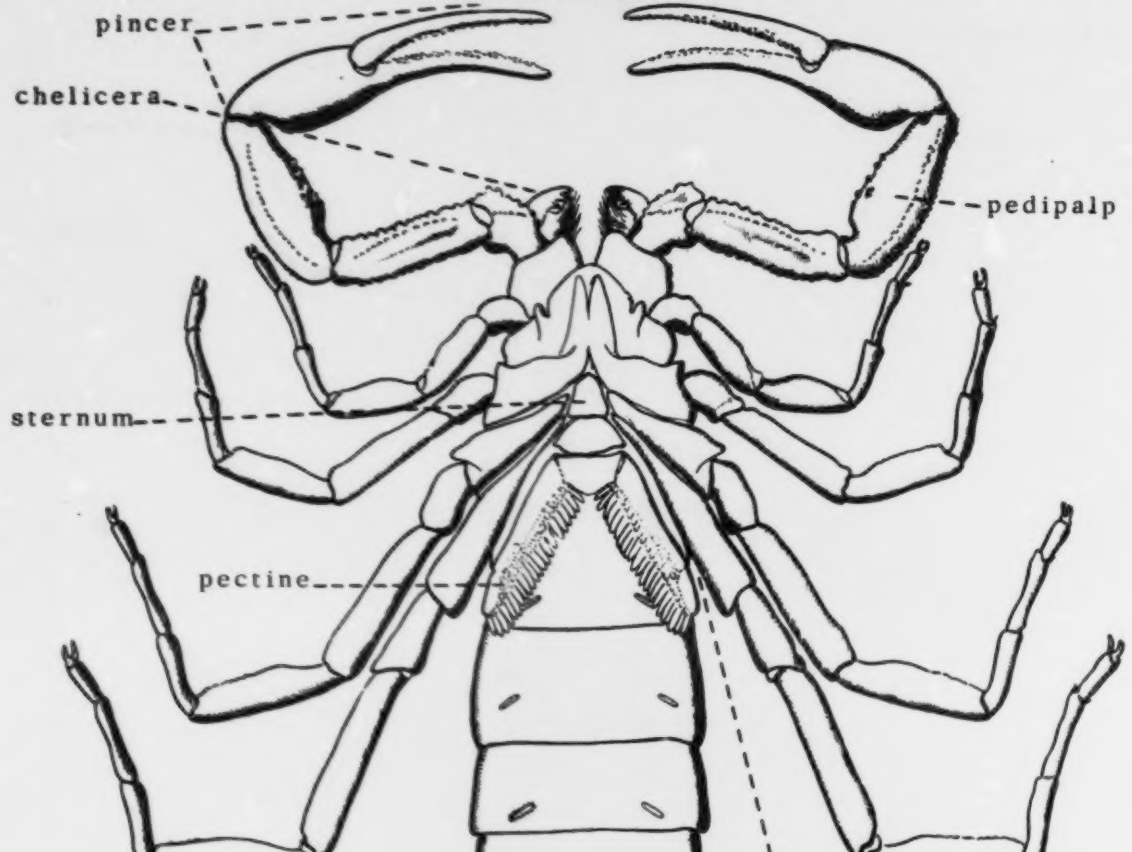
SCORPION DIAGRAM: VENTRAL VIEW OF CENTRUROIDES VITTATUS

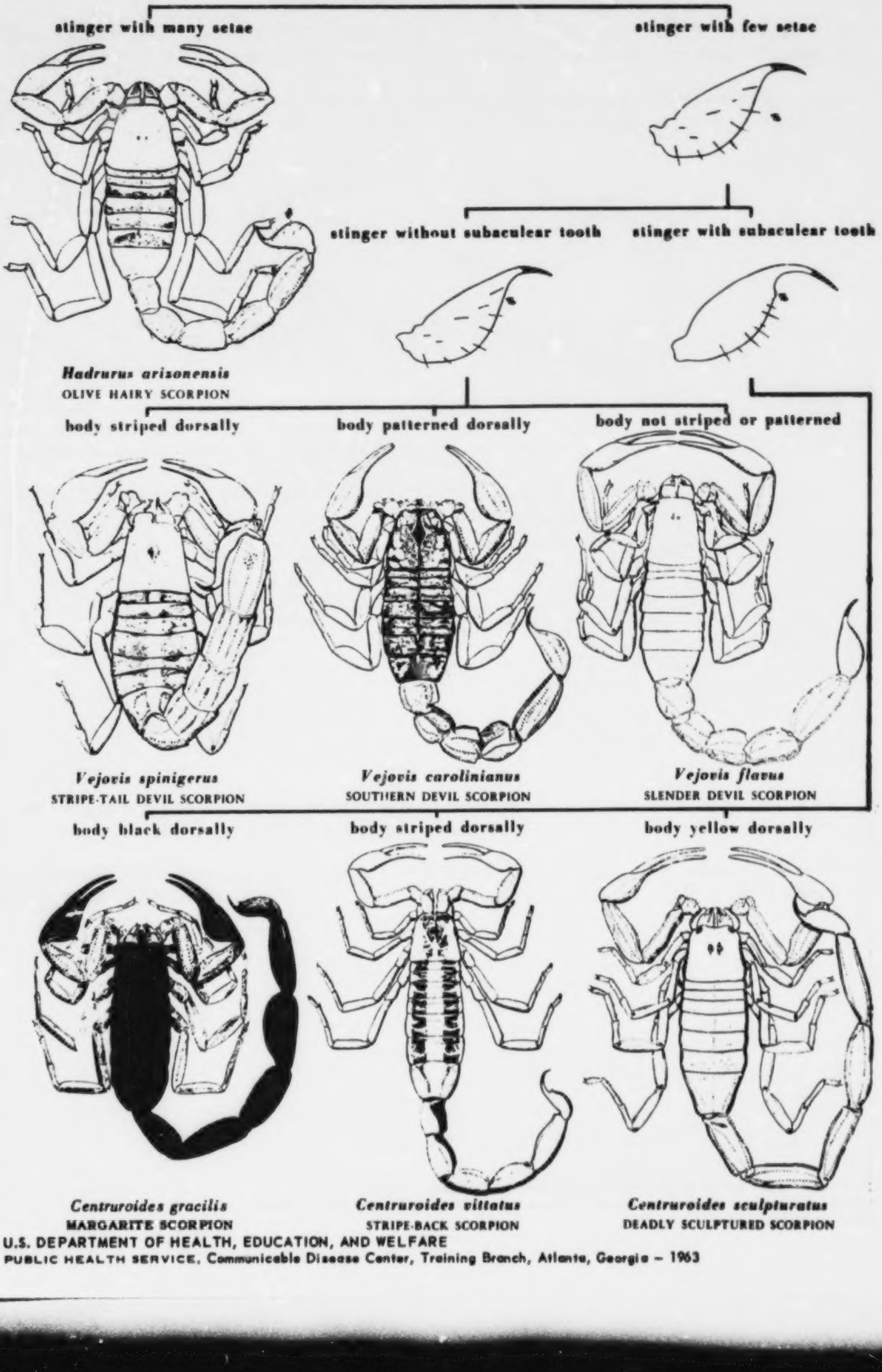
Chester J. Stojanovich


pincer
chelicera
pedipalp
sternum
pectine
preabdomen
stinger
subaculear spine
caudal vesicle
postabdomen

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

SCORPIONS: PICTORIAL KEY TO SOME COMMON UNITED STATES SPECIES

Chester J. Stojanovich and Harold George Scott


stinger with many setae
stinger with few setae
Hadrurus arizonensis
OLIVE HAIRY SCORPION
stinger without subaculear tooth
stinger with subaculear tooth
body striped dorsally
body patterned dorsally
body not striped or patterned
Vejovis spinigerus
STRIPE-TAIL DEVIL SCORPION
Vejovis carolinianus
SOUTHERN DEVIL SCORPION
Vejovis flavus
SLENDER DEVIL SCORPION
body black dorsally
body striped dorsally
body yellow dorsally
Centruroides gracilis
MARGARITE SCORPION
Centruroides vittatus
STRIPE-BACK SCORPION
Centruroides sculpturatus
DEADLY SCULPTURED SCORPION

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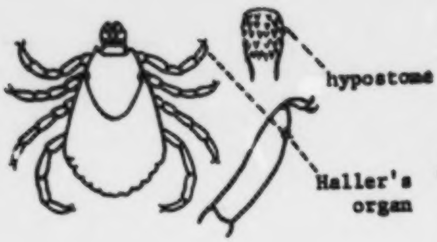
ACARINA: ILLUSTRATED KEY TO SOME COMMON ADULT FEMALE MITES AND ADULT TICKS

Harry D. Pratt and Chester J. Stojanovich

1. Last segment of first leg with a depression known as Haller's organ; most species with a toothed hypostome on capitulum; size usually over 4 mm. (Fig. 1 A). Ticks 21

Last segment of first leg without such a depression known as Haller's organ; hypostome not toothed; most species less than 4 mm. long (Fig. 1 B). Mites....................2

Fig. 1 A



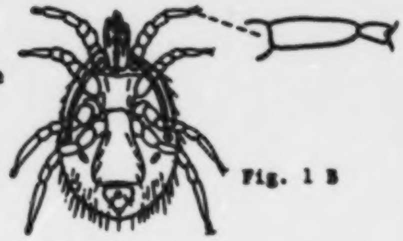
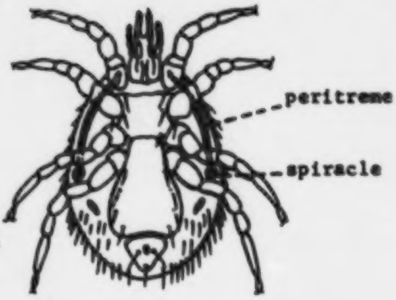


Fig. 1 B

2. Respiratory system with a spiracle on each side opening lateral to the bases of the 3rd or 4th pair of legs, frequently spiracles leading into slender tubes that extend forward laterally to the bases of the 1st or 2nd pairs of legs Fig. 2 A). Mesostigmatid Mites. 3

Respiratory system without spiracles, or with spiracles opening near bases of the chelicerae (Fig. 2 B)...13

Fig. 2 A



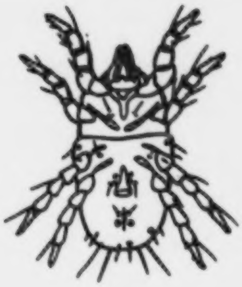
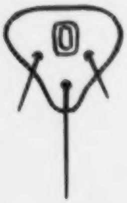


Fig. 2 B

3. Anus surrounded by a plate bearing only 3 setae, one on each side and one behind the anal opening; first tarsus bearing caruncle and claws at tip (Fig. 3 A)...............4

Anus surrounded by a plate bearing more than 3 setae; first tarsus without caruncle and claws (Fig. 3 B)................................. Many species of Macrocheles

Fig. 3 A



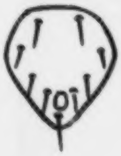


Fig. 3 B

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– Revised 1966 by Harold George Scott

4. Anal opening more than its length behind anterior margin of anal plate; chelicerae strongly narrowed apically, needle-like, movable chela absent or extremely small (Fig. 4 A). Genus *Dermanyssus* 5

Anal opening less than its length or about its length, behind anterior margin of anal plate; chelicerae not narrowed apically and needle-like, shear-like, bearing conspicuous shear-like chelae at tip which may or may not bear teeth (Fig. 4 B).............. 7

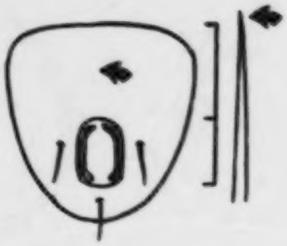


Fig. 4 A

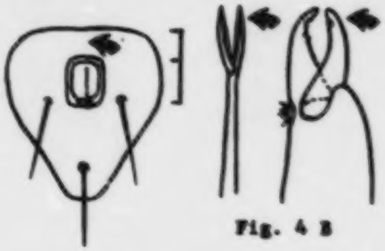


Fig. 4 B

5. Dorsal surface of body with a single plate (Fig. 5 A)................................6

Dorsal surface of body with two plates, a large anterior plate and a small posterior plate (Fig. 5 B). *Dermanyssus sanguineus*...................... HOUSE MOUSE MITE

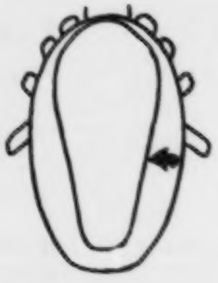


Fig. 5 A

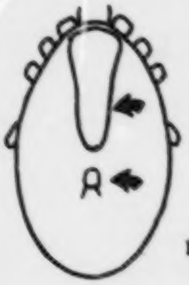


Fig. 5 B

6. Peritreme tube somewhat sinuous and extending anteriorly to a point opposite coxa 2 (Fig. 6 A). *Dermanyssus gallinae*................................. CHICKEN MITE

Peritreme tube short, extending forward for a distance less than half the diameter of coxa 3 (Fig. 6 B). *Dermanyssus americanus*.................. AMERICAN BIRD MITE

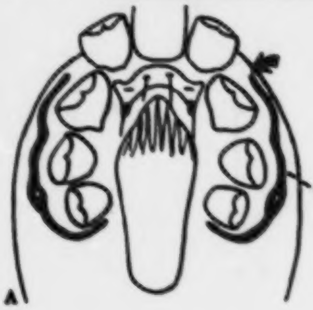


Fig. 6 A

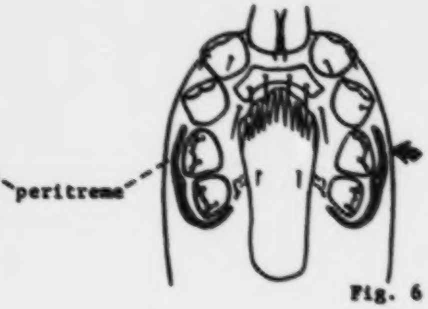


Fig. 6 B

7. Dorsal plate not covering entire dorsal surface of mite; genito-ventral plate typically narrowed posteriorly behind 4th coxae; chelae on chelicerae without teeth or setae (Fig. 7 A). Genus Ornithonyssus 8

Dorsal plate almost covering entire dorsal surface of mite; genito-ventral plate typically expanded posterior to 4th coxae; one or both chelae of chelicerae with teeth and a seta (Fig. 7 B). Family Laelaptidae..10

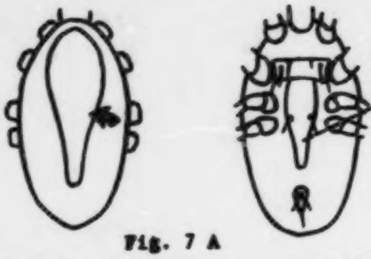


Fig. 7 A

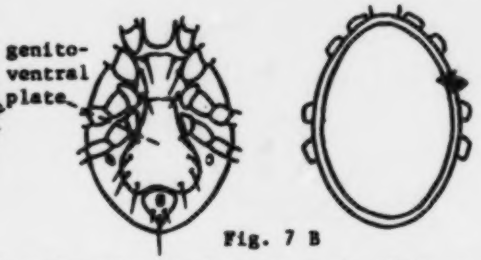


Fig. 7 B

8. Sternal plate with anterior and middle pairs of sternal setae on the plate, posterior pair usually just off the plate (Fig. 8 A). On Birds... Ornithonyssus sylviarum.. NORTHERN FOWL MITE

Sternal plate with the usual three pairs of setae on the plate (Fig. 8 B)............... 9

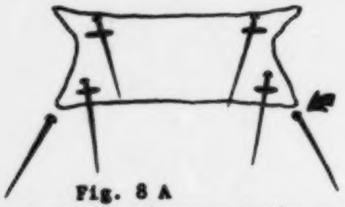


Fig. 8 A

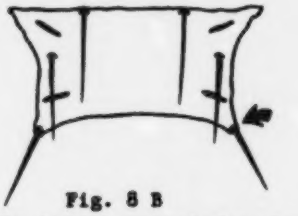


Fig. 8 B

9. Dorsal plate narrowed posteriorly; setae in middle dorsal row of plate longer than the distance between their bases (Fig. 9 A). Normally on mammals or man............. Ornithonyssus bacoti.......................................TROPICAL RAT MITE

Dorsal plate broader posteriorly; setae in middle dorsal row of plate much shorter than the distance between their bases (Fig. 9 B). Normally on birds...................... Ornithonyssus bursa.......................................TROPICAL BIRD MITE

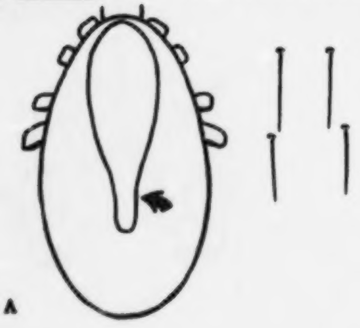


Fig. 9 A

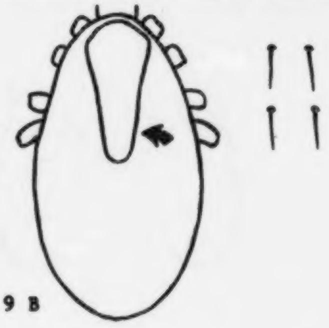


Fig. 9 B

10. Genito-ventral plate with many fine setae; anal plate transverse, wider than long (Fig. 10 A). On domestic rats and a wide variety of wild mammals..... Eulaelaps stabularis

Genito-ventral plate with one to four pairs of setae; anal plate longer than wide (Fig. 10 B)...11

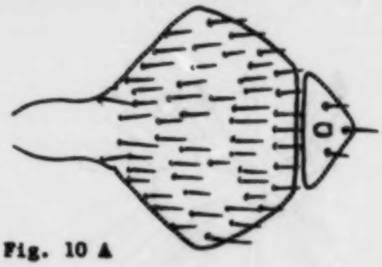


Fig. 10 A

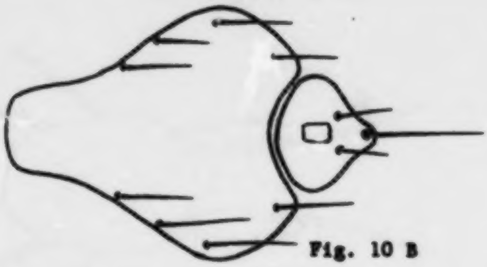


Fig. 10 B

11. Genito-ventral plate with only a single pair of setae (Fig. 11 A). On domestic rats and mice and a wide variety of mammals and birds..................................... Haemolaelaps glasgowi....................................COMMON RODENT MITE

Genito-ventral plate with four pairs of setae (Fig. 11 B). Normally on domestic rats..12

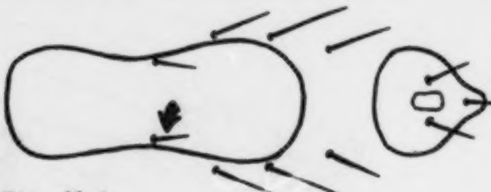


Fig. 11 A

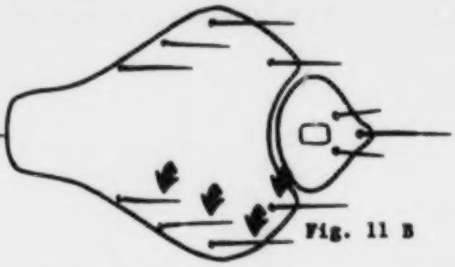


Fig. 11 B

12. Anal plate contiguous with the genito-ventral plate, anterior margin rounded and fitting into a strong concavity in genito-vental plate; larger species averaging 1-2 mm. long. (Fig. 12 A). Echinolaelaps echidninus..... ....SPINY RAT MITE

Anal plate somewhat separated from genito-ventral plat, anterior margin almost straight with definite anterior-lateral corners; small species averaging 0.5-1 mm long (Fig. 12 B). Laelaps nuttalli..............................DOMESTIC RAT MITE

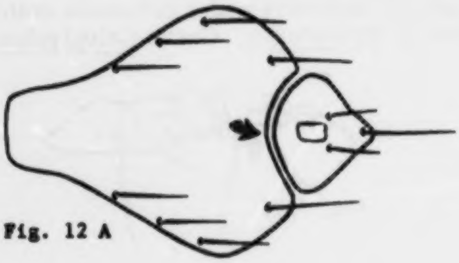


Fig. 12 A

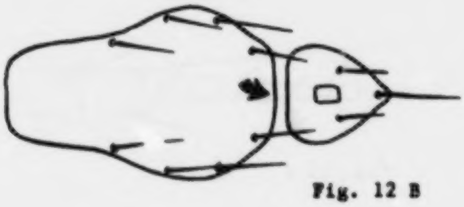


Fig. 12 B

13. First pair of legs very long, much longer than other three pairs; anterior margin of body with four distinct flattened scales and somewhat flattened scales on other dorsal surfaces of body (Fig. 13 A). Plant feeders which invade buildings but do not bite man. *Bryobia praetiosa*..CLOVER MITE

First pair of legs not markedly longer than the other three pairs of legs; no flattened scales on body (Fig. 13 B)..14

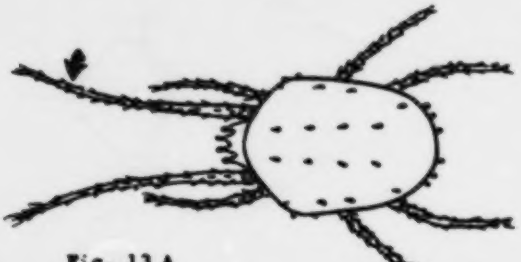


Fig. 13 A

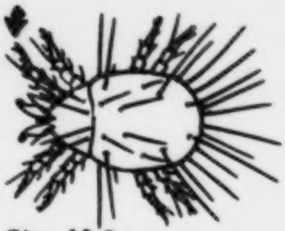


Fig. 13 B

14. Surface of body without fine parallel lines or folds; tarsi without stalked suckers (Fig. 14 A). Adults never true parasites (Cheese or Flour mites).......................15

Surface of body with fine parallel lines or folds; tarsi often provided with stalked suckers (Fig. 14 B). Scabies or mange mites parasitic in all stages, chiefly on vertebrates 16

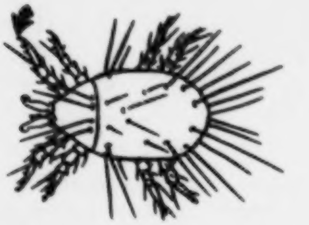


Fig. 14 A

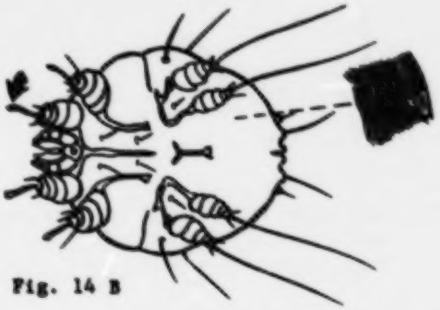


Fig. 14 B

15. Tarsi tapering markedly to tip (Fig. 15 A)....................*Glycyphagus prunorum*

Tarsi not tapering markedly to tip (Fig. 15 B). Many cheese and flour mites which are difficult to separate except with very specialized literature and a reference collection. ....Genus *Tyrophagus*, Genus *Caloglyphus*, Etc.

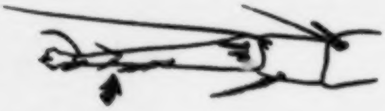


Fig. 15 A

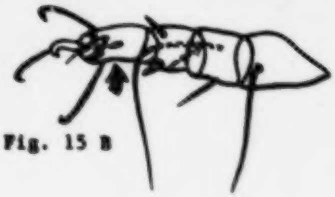


Fig. 15 B

16. Body elongate, somewhat cigar-shaped and prolonged behind; the abdomen somewhat ringed; legs very short, apparently three-segmented; tiny species less than 1 mm. (Fig. 16 A). In hair follicles or sebaceous glands of mammals........................ Demodex folliculorum..................................PORE OR FOLLICLE MITE

Body not prolonged behind and cigar-shaped (Fig. 16 B). Occasionally female grain itch somewhat balloon-shaped; larger species not found in hair follicle or sebaceous glands of mammals.. 17

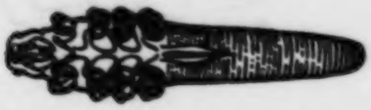


Fig. 16 A

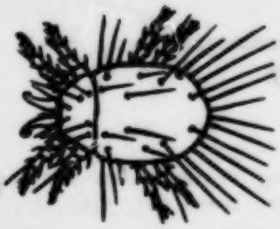


Fig. 16 B

17. A club-shaped or clavate hair between bases of first and second pairs of legs, body divided into cephalothorax and abdomen, the latter often enormously enlarged (Fig. 17 A) Pyemotes ventricosus formerly Pediculoides ventricosus..........STRAW ITCH MITE

Setae on cephalothorax normal, no club-shaped or clavate hair between bases of first and second pairs of legs; no distinct division into cephalothorax and abdomen (Fig. 17 B) 18

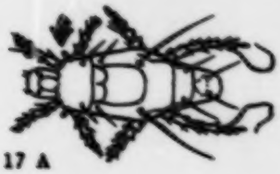


Fig. 17 A

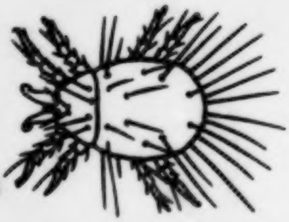


Fig. 17 B

18. Legs short and stubby (Fig. 18 A)..20

Legs longer and more slender (Fig. 18 B)..19

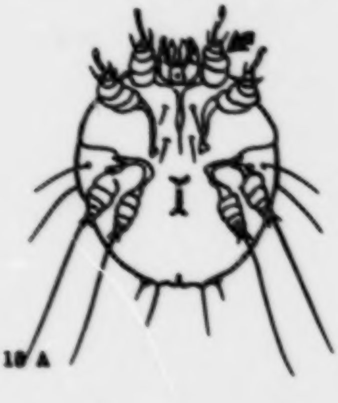


Fig. 18 A

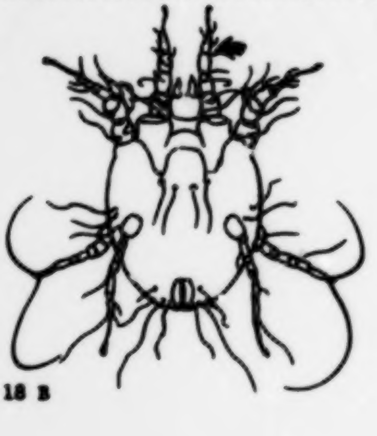


Fig. 18 B

19. Suckers of tarsi with segmented pedicels (Fig. 19 A). Non-burrowing itch mites on mammals in the genus Psoroptes, a common species causing scabs and crusts in the ears of rabbits is the Psoroptes cuniculi........................ RABBIT EAR MITE

Suckers of tarsi without segmented pedicels (Fig. 19 B)..........................
.... Dermatophagoides scheremetewskyi

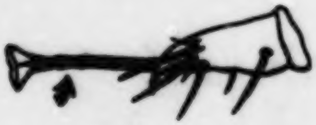


Fig. 19 A

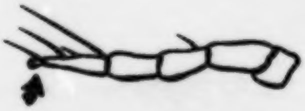


Fig. 19 B

20. Anal opening on the dorsal surface of the body; dorsal surface of the body with only short, sharp setae (Fig. 20 A)..Notoedres

Anal opening at tip of body or slightly on ventral side; dorsal surface of body with pointed scales and blunt stout spines (Fig. 20 B). Sarcoptes scabiei................
.... SCABIES OR MANGE MITE

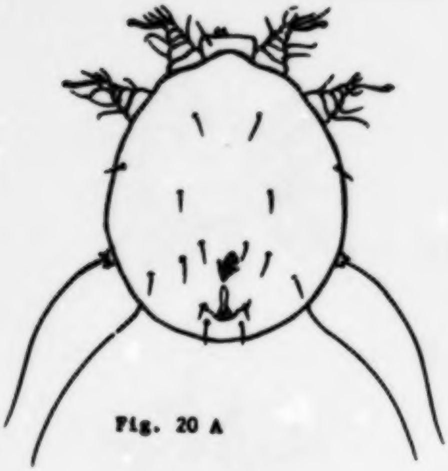


Fig. 20 A

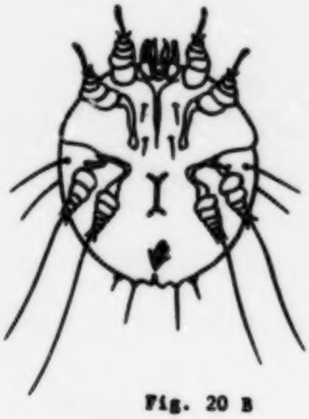


Fig. 20 B

21. Capitulum at anterior end of body, visible from above and below; scutum or dorsal shield present, short in female, long in male (Fig. 21 A & B). Family Ixodidae..HARD TICKS...22

Capitulum on under side of body, hidden by body when seen from above though palpi may project anteriorly; scutum absent (Fig. 21 C & D). Family Argasidae.....SOFT TICKS....31

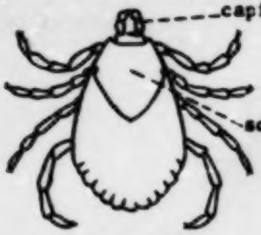

capitulum
scutum

Fig. 21 A

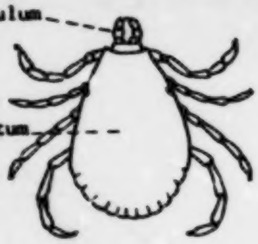


Fig. 21 B

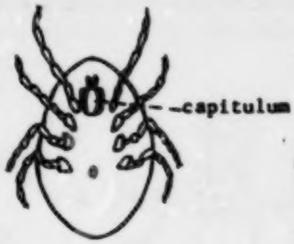


Fig. 21 C

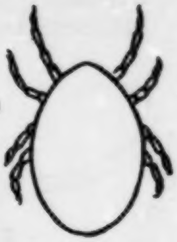


Fig. 21 D

FAMILY IXODIDAE - HARD TICKS

22. Ornate ticks, with some white markings on dorsal shield (Fig. 22 A)....................23

Inornate ticks, without white markings on dorsal shield (Fig. 22 B)....................28

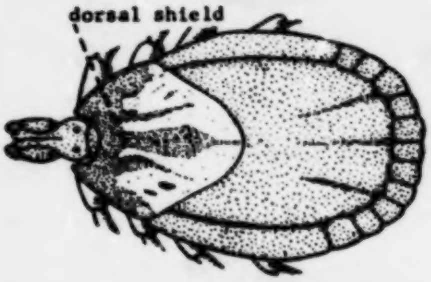

dorsal shield

Fig. 2 A

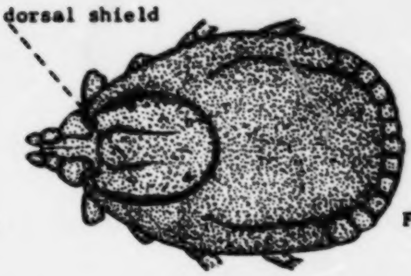

dorsal shield

Fig. 2 B

23. Palpi long, much longer than basis capituli; second segment of palpus about twice as long as wide (Fig. 23A). Genus Amblyomma..24

Palpi short, about as long as basis capituli; second segment of palpus about as long as wide (Fig. 23 B). Genus Dermacentor..25

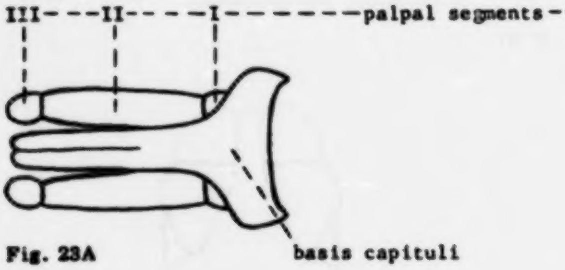

III
II
I
palpal segments
basis capituli

Fig. 23A

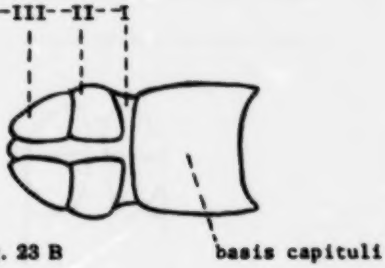

III
II
I
basis capituli

Fig. 23 B

24. Next to last segment of second, third, and fourth pairs of legs without paired terminal spurs; female with a distinct pale marking near posterior end of dorsal shield (Fig. 24 A). Amblyomma americanum..LONE STAR TICK

Next to last segment of second, third, and fourth pairs of legs with long, paired terminal spurs; female with more diffuse markings on dorsal shield (Fig. 24 B)................ Amblyomma maculatum..GULF COAST TICK

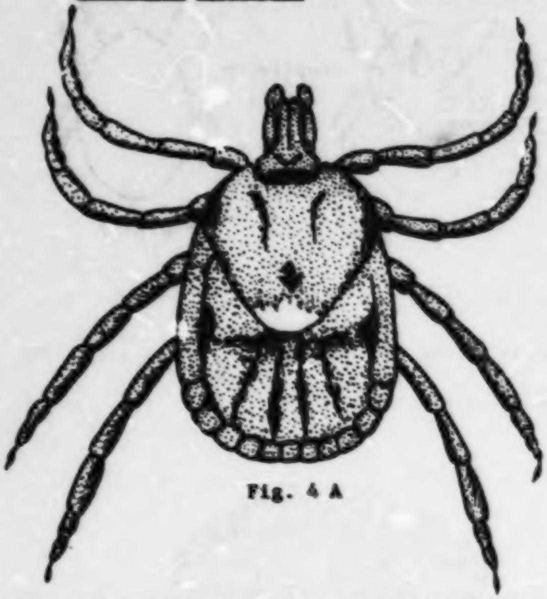


Fig. 4 A

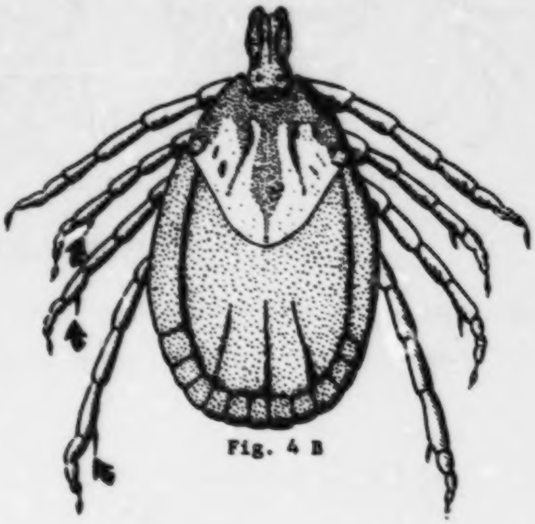


Fig. 4 B

25. Spiracular plate without dorsal prolongation (Fig. 25 A). Dermacentor albipictus........ ....WINTER TICK

Spiracular plate with dorsal prolongation (Fig. 25 B)...................................26

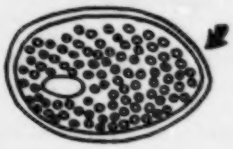


Fig. 25 A

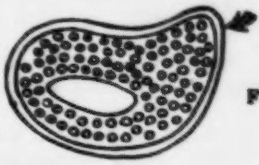


Fig. 25 B

26. Basis capituli with long cornua (Fig. 26 A). Dermacentor occidentalis.PACIFIC COAST TICK

Basis capituli with short cornua (Fig. 26 B)...27

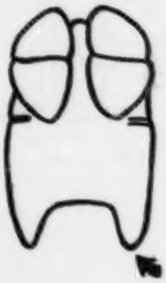


Fig. 26 A

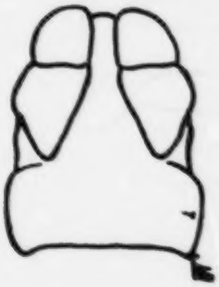


Fig. 26 B

27. Goblets of spiracular plate large and less numerous; Rocky Mountain species. (Fig. 27 A) __Dermacentor__ __andersoni__..ROCKY MOUNTAIN WOOD TICK

Goblets of spiracular plate very small and numerous; east of the Rocky Mountains and on the Pacific coast. (Fig. 27 B). __Dermacentor__ __variabilis__................AMERICAN DOG TICK

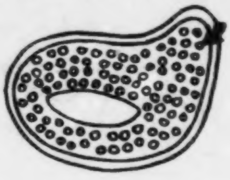


Fig. 27 A

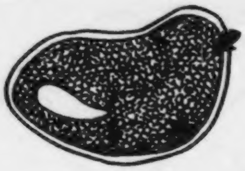


Fig. 27 B

28. Sides of basis capituli laterally produced; distinctly angulate; eyes present on sides of scutum (Fig. 28 A & B)..29

Sides of basis capituli not laterally produced; more or less parallel (Fig. 28 C); eyes absent...30

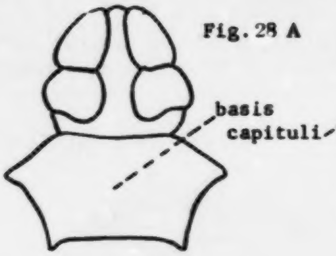


Fig. 28 A

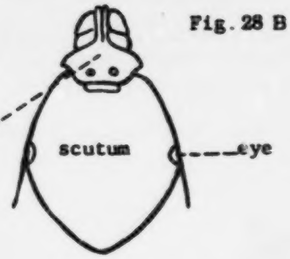


Fig. 28 B

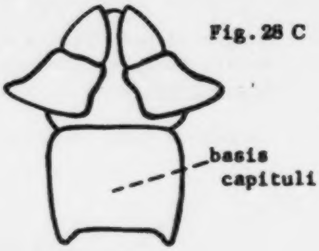


Fig. 28 C

29. Fore coxa deeply cleft; festoons present; easily seen in unengorged specimens; anal groove distinct in unengorged specimens (Fig. 29 A). (principally on dogs or in houses) __Rhipicephalus__ __sanguineus__..BROWN DOG TICK

Fore coxa not deeply cleft; festoons absent; anal groove indistinct (Fig. 29 B). (On cattle and deer). __Boophilus__ __annulatus__..CATTLE TICK

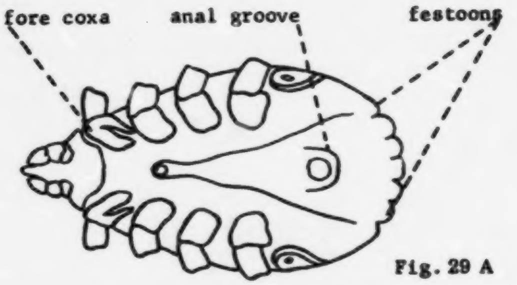


Fig. 29 A

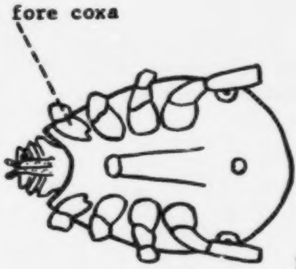


Fig. 29 B

30. Second segment of palpus laterally produced; anal groove behind anus, not attaining posterior margins of body (Fig. 30 A & B). Haemaphysalis leporispalustris.....RABBIT TICK

Second segment of palpus not laterally produced; anal groove extending as an inverted U from in front of anus to posterior margins of body (Fig. 30 C).............Genus Ixodes

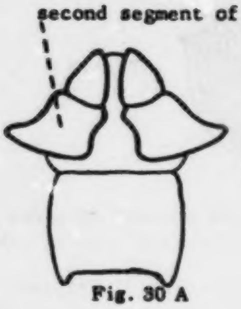


Fig. 30 A

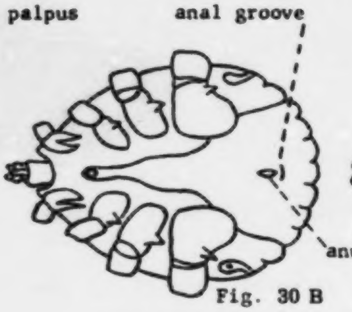


Fig. 30 B

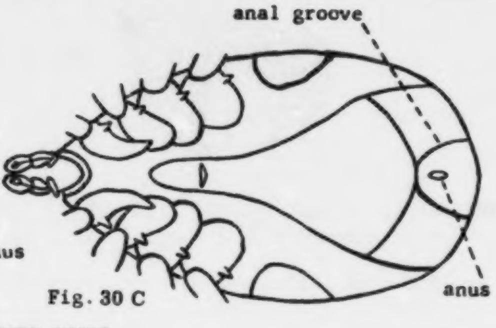


Fig. 30 C

FAMILY ARGASIDAE - SOFT TICKS

31. Margin of body with a definite sutural line separating dorsal and ventral surfaces; dorsal surface with conspicuous "discs" arranged somewhat in radiating lines (Fig. 31 A) Argas persicus..FOWL TICK

Margin of body lacking definite sutural line, thick and rounded (Fig. 31 B)..........32

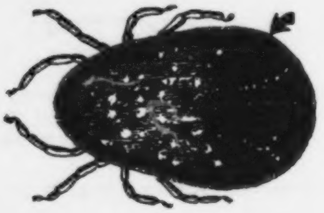


Fig. 31 A

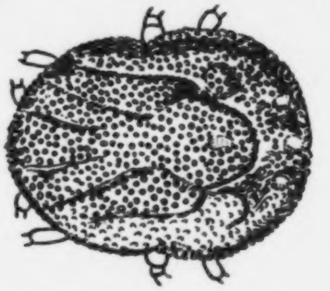


Fig 31 B

32. Hypostome with well-developed teeth (Fig. 32 A); integument not spinose................ Genus Ornithodoros...33

Hypostome of adult vestigial or without effective teeth; integument of nymph (stage usually seen) spinose (Fig. 32 B). Usually on cattle and horses....................... Otobius megnini...SPINOSE EAR TICK

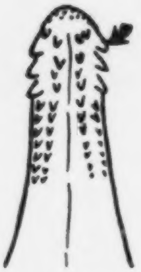


Fig. 32 A

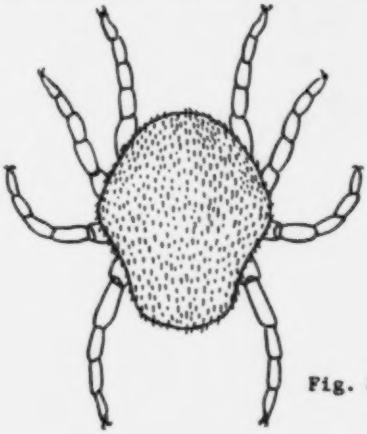


Fig. 32 B

33. Strong dorsal humps absent on all tarsi (Fig. 33 A)....................................34

Strong dorsal humps present on tarsi of first, second and third legs (Fig. 33 B)......35

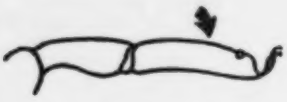


Fig. 33

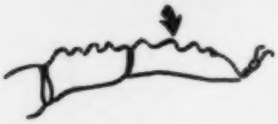


Fig. 33 B

34. Cheeks absent (Fig. 34 A). Ornithodoros hermsi..............HERMS' RELAPSING FEVER TICK

Cheeks present (Fig. 34 B)...Ornithodoros talaje

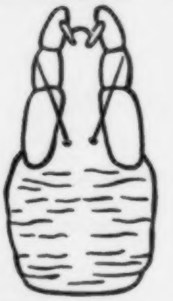


Fig. 34 A

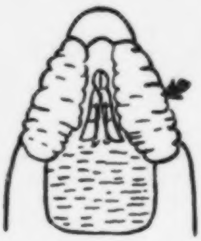


Fig. 34 B

35. Eyes present on sides of body above second and third coxae (Fig. 35 A); tarsus of fourth leg with a prominent, pointed subterminal spur (Fig. 35 B)..............................
Ornithodoros coriaceus..PAJAROELLO TICK

Eyes absent; tarsus of fourth leg without such subterminal spur (Fig. 35 C)...........15

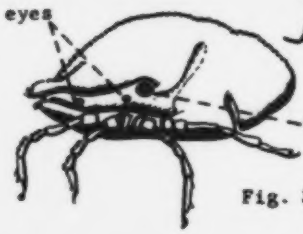


Fig. 35 A

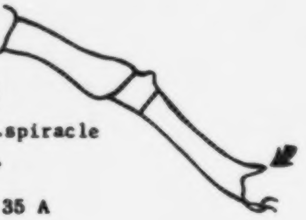


Fig. 35 B

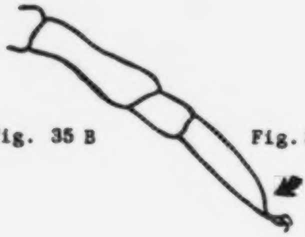


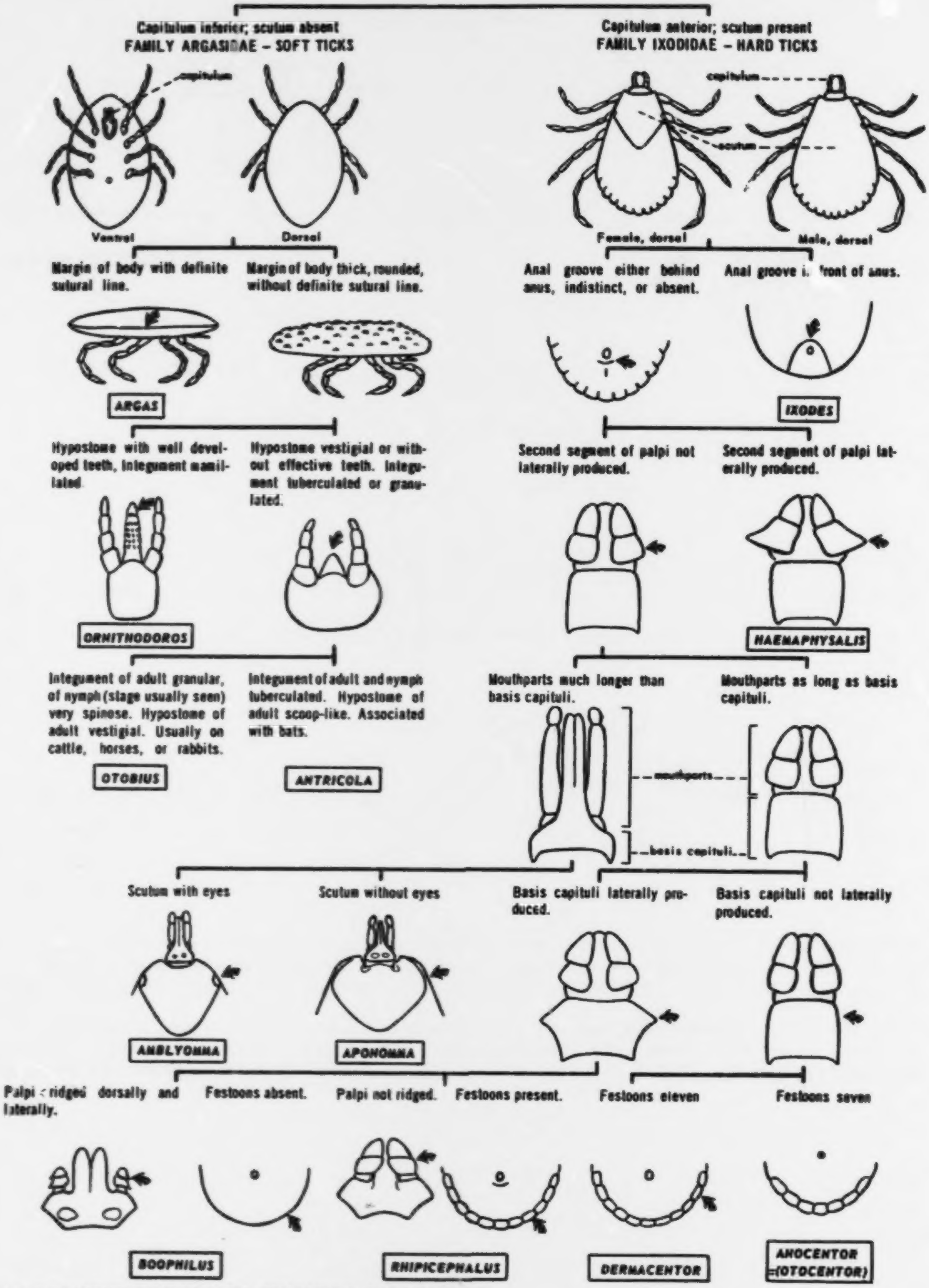
Fig. 35 C

36. Mammillae large, relatively few and not crowded; in mid-dorsal region about 10 per linear mm.; hypostome over 1/2 mm. long. Southeastern United States and Mexico north to Kansas and Florida. Ornithodoros turicata.......................RELAPSING FEVER TICK

Mammillae small, crowded, and numerous; in mid-dorsal region about 18 per linear mm.; hypostome less than 1/2 mm. long. Pacific coast and Rocky Mountain states..............
Ornithodoros parkeri.................................PARKER'S RELAPSING FEVER TICK

TICKS: KEY TO GENERA IN UNITED STATES

Harry D. Pratt



Capitulum inferior; scutum absent
FAMILY ARGASIDAE – SOFT TICKS

Margin of body with definite sutural line. — **ARGAS**

Margin of body thick, rounded, without definite sutural line.

Hypostome with well developed teeth, integument mamillated. — **ORNITHODOROS**

Hypostome vestigial or without effective teeth. Integument tuberculated or granulated.

Integument of adult granular, of nymph (stage usually seen) very spinose. Hypostome of adult vestigial. Usually on cattle, horses, or rabbits. — **OTOBIUS**

Integument of adult and nymph tuberculated. Hypostome of adult scoop-like. Associated with bats. — **ANTRICOLA**

Capitulum anterior; scutum present
FAMILY IXODIDAE – HARD TICKS

Anal groove either behind anus, indistinct, or absent.

Anal groove in front of anus. — **IXODES**

Second segment of palpi not laterally produced.

Second segment of palpi laterally produced. — **HAEMAPHYSALIS**

Mouthparts much longer than basis capituli.

Mouthparts as long as basis capituli.

Scutum with eyes — **AMBLYOMMA**

Scutum without eyes — **APONOMMA**

Basis capituli laterally produced.

Basis capituli not laterally produced.

Palpi ridged dorsally and laterally. — **BOOPHILUS**

Festoons absent.

Palpi not ridged. Festoons present. — **RHIPICEPHALUS**

Festoons eleven — **DERMACENTOR**

Festoons seven — **ANOCENTOR (OTOCENTOR)**

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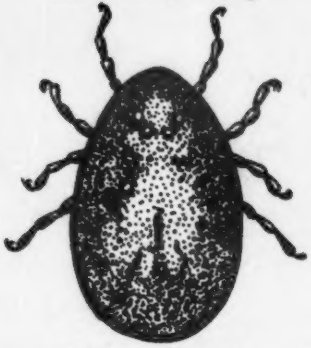
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1961

TICKS AND MITES: KEY TO SPECIES COMMONLY INFESTING PIGEONS

Harold George Scott & Chester J. Stojanovich

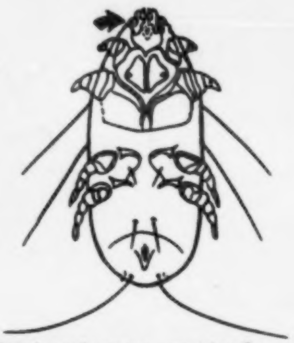
mouthparts ventral

adult 6-9 mm. long



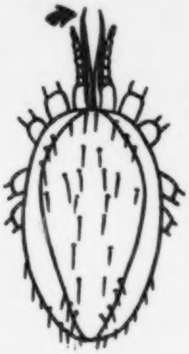
Argas reflexus
PIGEON TICK

adult 0.25 mm. long

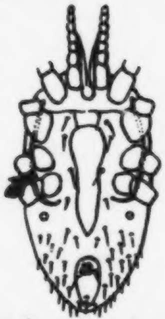


Laminosioptes cysticola
FOWL CYST MITE

mouthparts anterior
under 0.6 mm. long



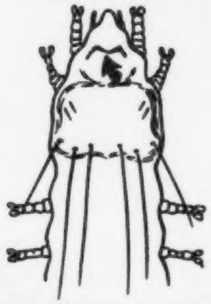
with lateral spiracles



Ornithonyssus bursa
TROPICAL FOWL MITE or
Dermanyssus gallinae
CHICKEN MITE

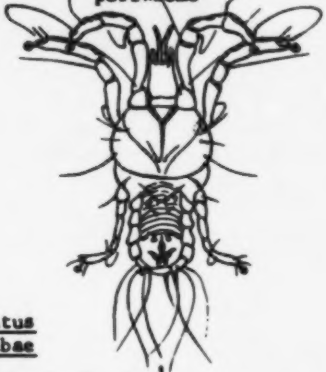
without lateral spiracles

with M-shaped
peritreme

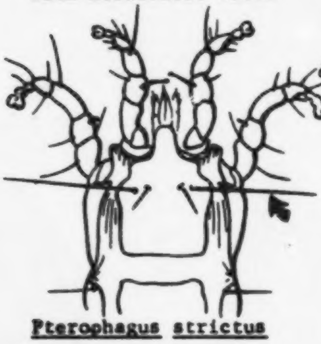


Syringophilus bipectinatus
or *Syringophilus columbae*
PIGEON QUILL MITES

without M-shaped
peritreme



with horizontal setae

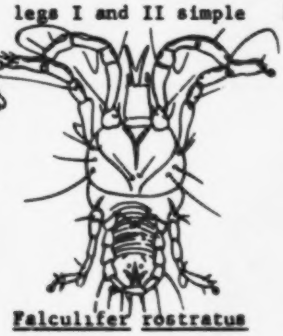


Pterophagus strictus

BODY-FEATHER MITE

without horizontal setae

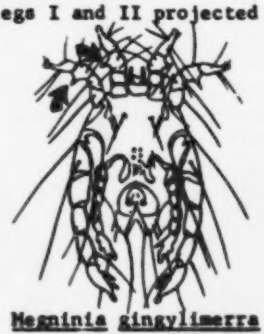
legs I and II simple



Falculifer rostratus

WING-FEATHER MITE

legs I and II projected



Megninia gingylimerra
or *Megninia cubitalis*
CONTOUR-FEATHER MITES

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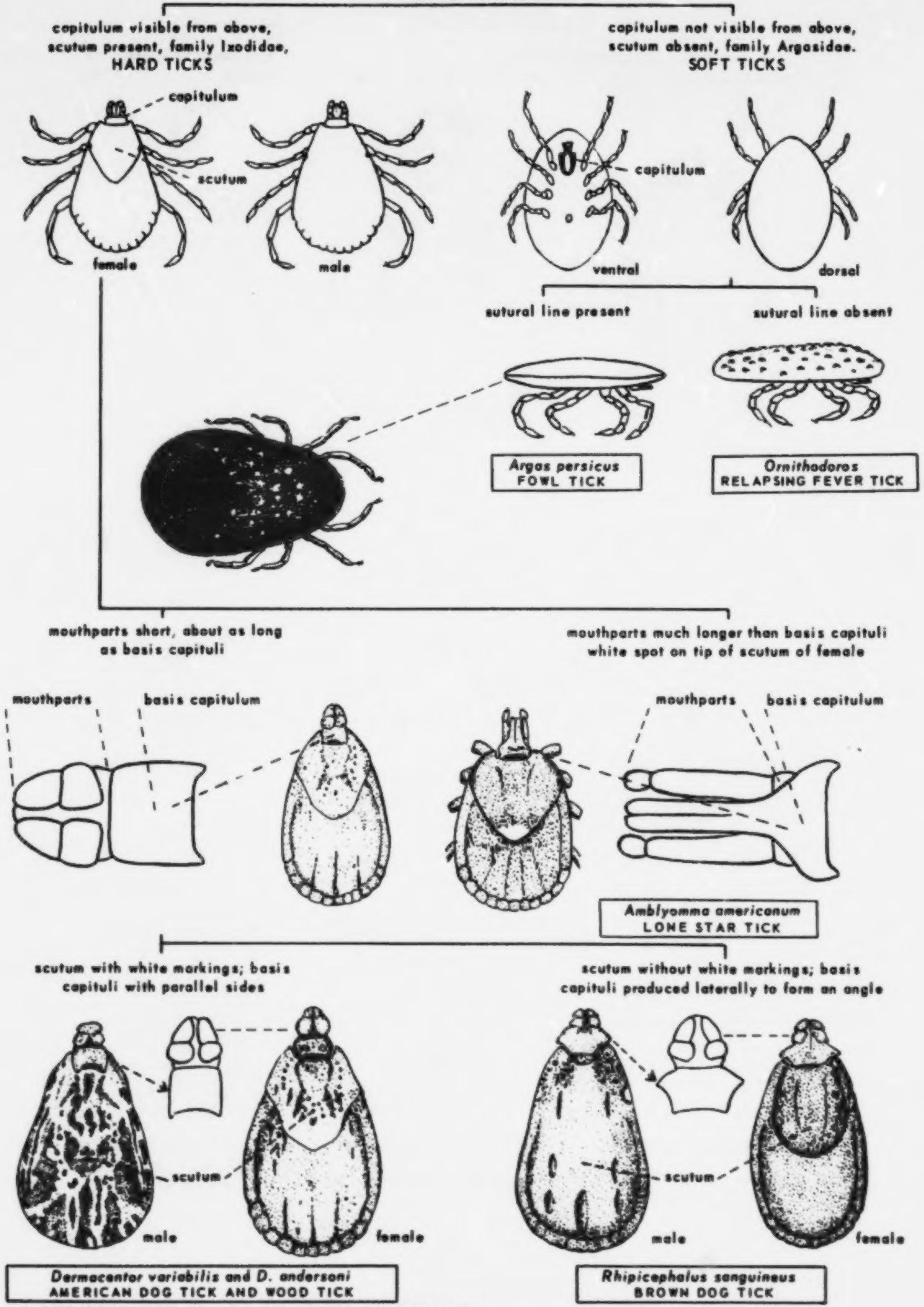
TICKS: PICTORIAL KEY TO SOME COMMON SPECIES

Harry D. Pratt


capitulum visible from above,
scutum present, family Ixodidae,
HARD TICKS
capitulum not visible from above,
scutum absent, family Argasidae.
SOFT TICKS
capitulum
scutum
female
male
capitulum
ventral
dorsal
sutural line present
sutural line absent
Argas persicus
FOWL TICK
Ornithodoros
RELAPSING FEVER TICK
mouthparts short, about as long
as basis capituli
mouthparts much longer than basis capituli
white spot on tip of scutum of female
mouthparts
basis capitulum
mouthparts
basis capitulum
Amblyomma americanum
LONE STAR TICK
scutum with white markings; basis
capituli with parallel sides
scutum without white markings; basis
capituli produced laterally to form an angle
scutum
male
female
scutum
male
female
Dermacentor variabilis and D. andersoni
AMERICAN DOG TICK AND WOOD TICK
Rhipicephalus sanguineus
BROWN DOG TICK

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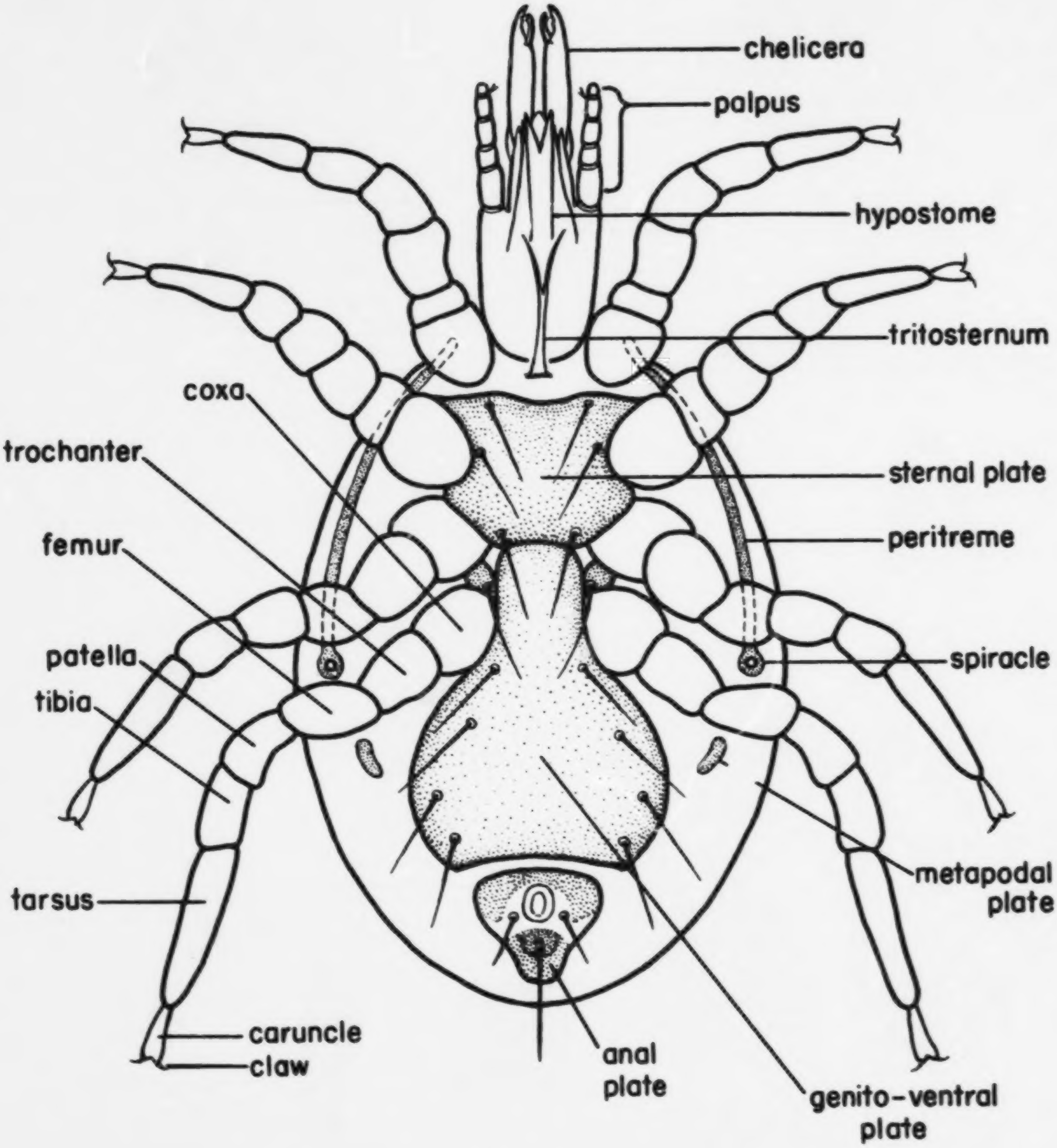
MITE DIAGRAM WITH STRUCTURES LABELED

Harry D. Pratt


chelicera
palpus
hypostome
tritosternum
coxa
trochanter
sternal plate
femur
peritreme
patella
spiracle
tibia
metapodal plate
tarsus
caruncle
claw
anal plate
genito-ventral plate

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MITES: PICTORIAL KEY TO SOME COMMON SPECIES OF PUBLIC HEALTH IMPORTANCE

Harold George Scott and Chester J. Stojanovich

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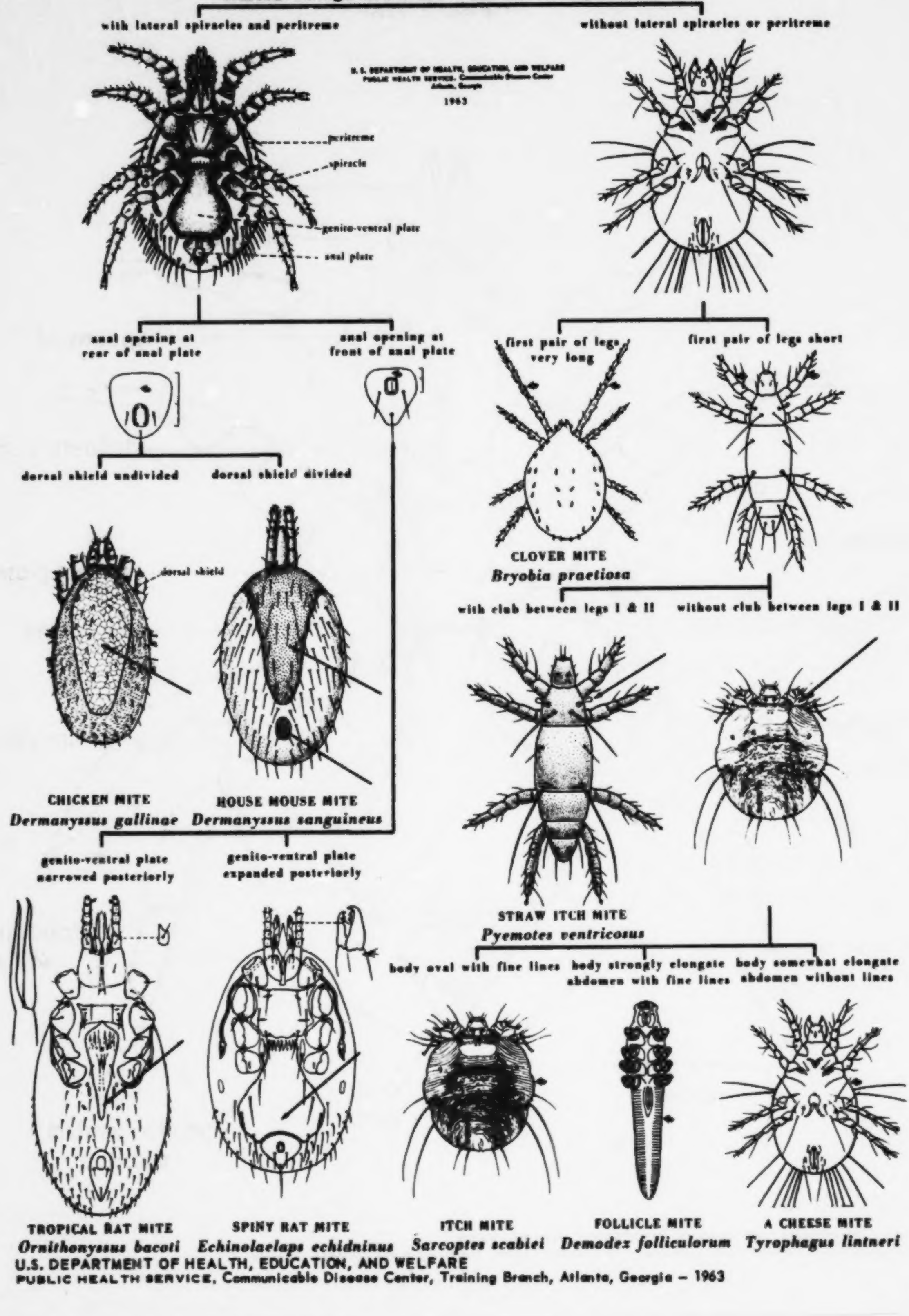
PUBLIC HEALTH SERVICE, Communicable Disease Center
Atlanta, Georgia
1963



with lateral spiracles and peritreme

without lateral spiracles or peritreme

anal opening at rear of anal plate

anal opening at front of anal plate

dorsal shield undivided

dorsal shield divided

CHICKEN MITE
Dermanyssus gallinae

HOUSE MOUSE MITE
Dermanyssus sanguineus

genito-ventral plate narrowed posteriorly

genito-ventral plate expanded posteriorly

TROPICAL RAT MITE
Ornithonyssus bacoti

SPINY RAT MITE
Echinolaelaps echidninus

first pair of legs very long

first pair of legs short

CLOVER MITE
Bryobia praetiosa

with club between legs I & II

without club between legs I & II

STRAW ITCH MITE
Pyemotes ventricosus

body oval with fine lines

body strongly elongate abdomen with fine lines

body somewhat elongate abdomen without lines

ITCH MITE
Sarcoptes scabiei

FOLLICLE MITE
Demodex folliculorum

A CHEESE MITE
Tyrophagus lintneri

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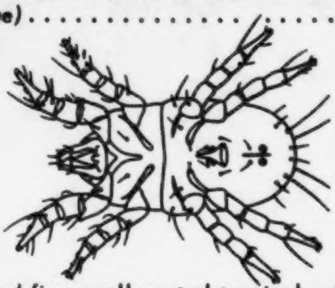
MITES: KEY TO SOME SPECIES COMMONLY INFESTING HOUSEHOLDS AND STORED FOOD

Harold George Scott

1. With club-like hair between bases of legs I and II 5
   Without club-like hair between bases of legs I and II 2

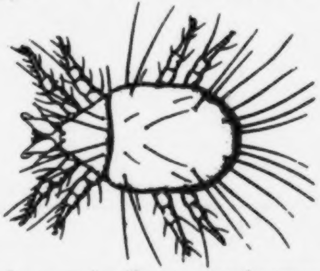
2. Claws, if present, not on stalks (*Glycyphagus domesticus*, formerly *Glyciphagus prunorum*) . . . . SUGAR MITE
   Claws on stalks 3

3. Internal apical hair (on joint between femur I and tibia I) less than three times as long as external apical hair 4
   Internal apical hair (on joint between femur I and tibia I) more than three times as long as external apical hair (*Acarus farinae*, formerly *Tyroglyphus farinae*) . . . . HAM MITE



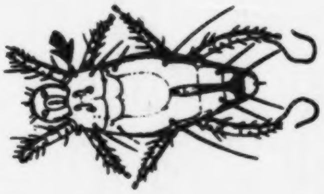
Acarus farinae

4. Tarsus with one stout dorsal and five small ventral terminal spines (*Acarus siro*, formerly *Tyroglyphus siro*) . . . . GRAIN MITE
   Tarsus with only three small ventral spines (*Tyrophagus castellani*, formerly *Tyroglyphus longior*) . . . . CHEESE MITE



Tyrophagus castellani

5. Tarsus IV of female ending in claws and a fleshy protuberance; leg IV of male smoothly curved inwards (*Pyemotes ventricosus*, formerly *Pediculoides ventricosus*) . . . . STRAW ITCH MITE
   Tarsus IV of female ending in two long hairs of unequal length; leg IV of male sharply bent (*Tarsonemus floricolus*) . . . . FLORICOLUS GRAIN MITE



Pyemotes ventricosus

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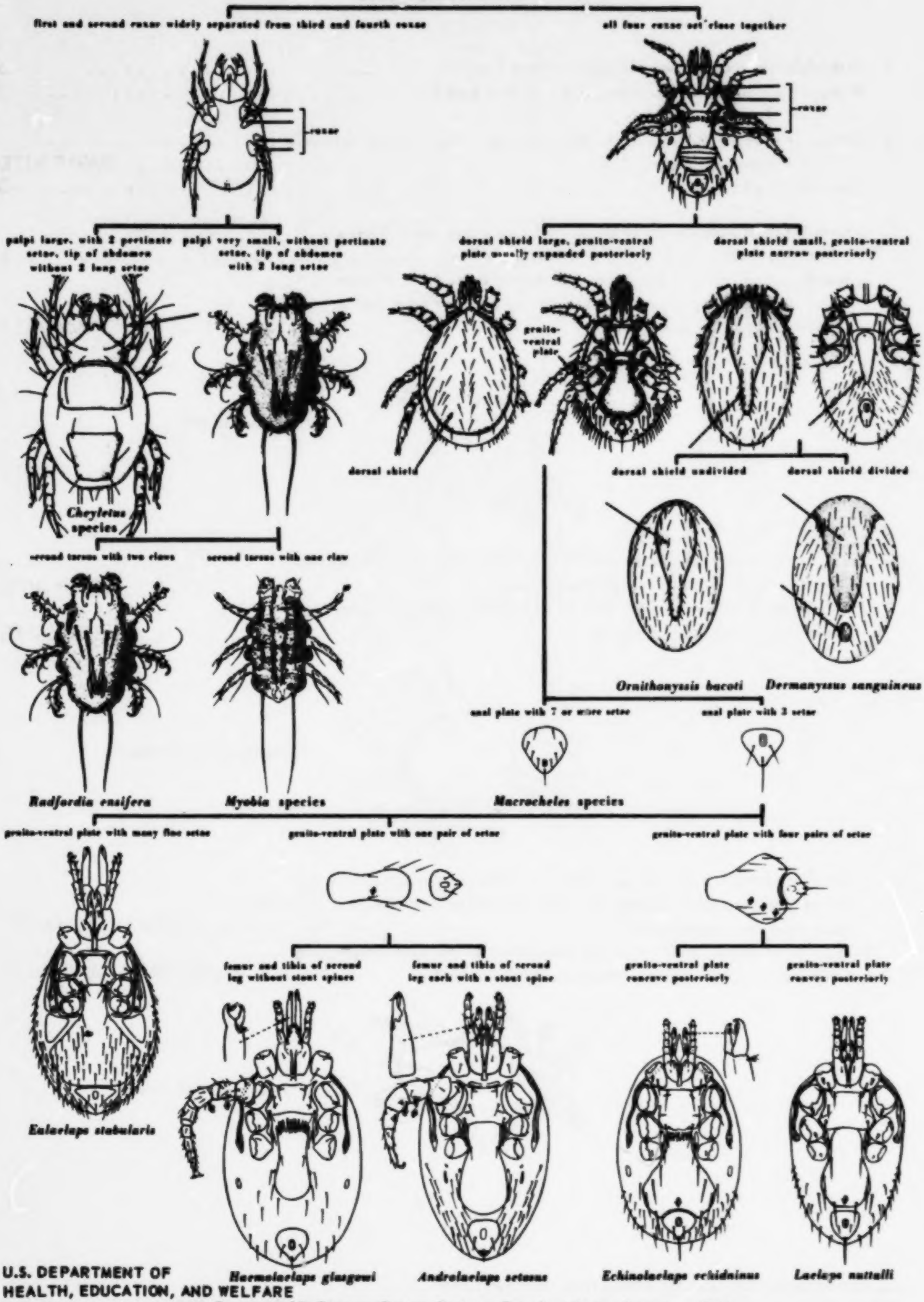
#44

MITES: PICTORIAL KEY TO ADULT FEMALES COMMONLY FOUND ON DOMESTIC RATS IN SOUTHERN UNITED STATES

Harry D. Pratt and Chester J. Stojanovich


first and second coxae widely separated from third and fourth coxae
all four coxae set close together
coxae
coxae
palpi large, with 2 pectinate setae, tip of abdomen without 2 long setae
palpi very small, without pectinate setae, tip of abdomen with 2 long setae
dorsal shield large, genito-ventral plate usually expanded posteriorly
dorsal shield small, genito-ventral plate narrow posteriorly
genito-ventral plate
Cheyletus species
dorsal shield
dorsal shield undivided
dorsal shield divided
second tarsus with two claws
second tarsus with one claw
Ornithonyssis bacoti
Dermanyssus sanguineus
anal plate with 7 or more setae
anal plate with 3 setae
Radfordia ensifera
Myobia species
Macrocheles species
genito-ventral plate with many fine setae
genito-ventral plate with one pair of setae
genito-ventral plate with four pairs of setae
femur and tibia of second leg without stout spines
femur and tibia of second leg each with a stout spine
genito-ventral plate concave posteriorly
genito-ventral plate convex posteriorly
Eulaelaps stabularis
Haemolaelaps glasgowi
Androlaelaps setosus
Echinolaelaps echidninus
Laelaps nuttalli

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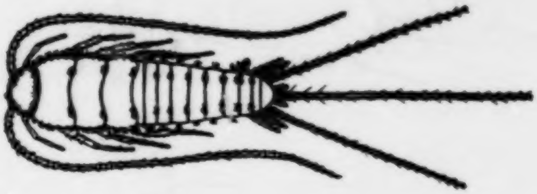
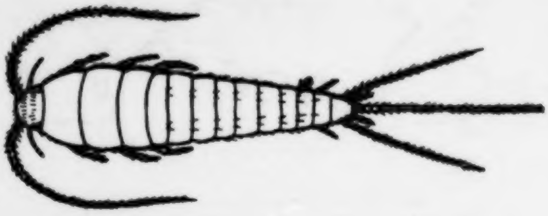
SILVERFISH. PICTORIAL KEY TO DOMESTIC SPECIES

Chester J. Stojanovich and Harold George Scott

setae in tufts
color brown

setae single

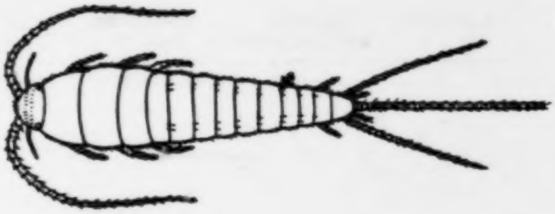


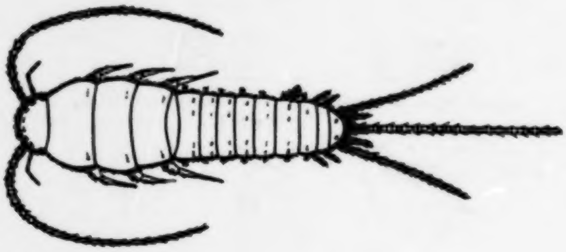


Thermobia domestica
FIREBRAT

without setal combs
color silver

with setal combs

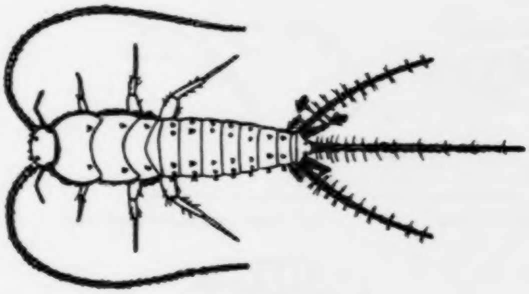


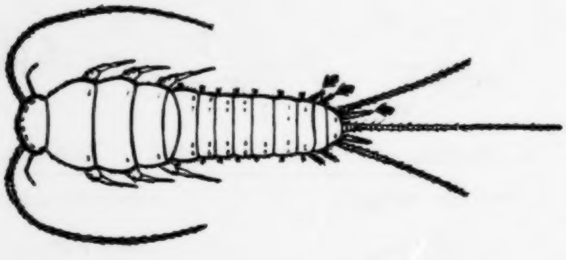


Lepisma saccharina
COMMON SILVERFISH

2 pairs of styli
color gray

3 pairs of styli
color brown





Ctenolepisma urbana
GIANT SILVERFISH
Ctenolepisma longicauda of some authors

Ctenolepisma quadriseriata
FOUR-LINED SILVERFISH

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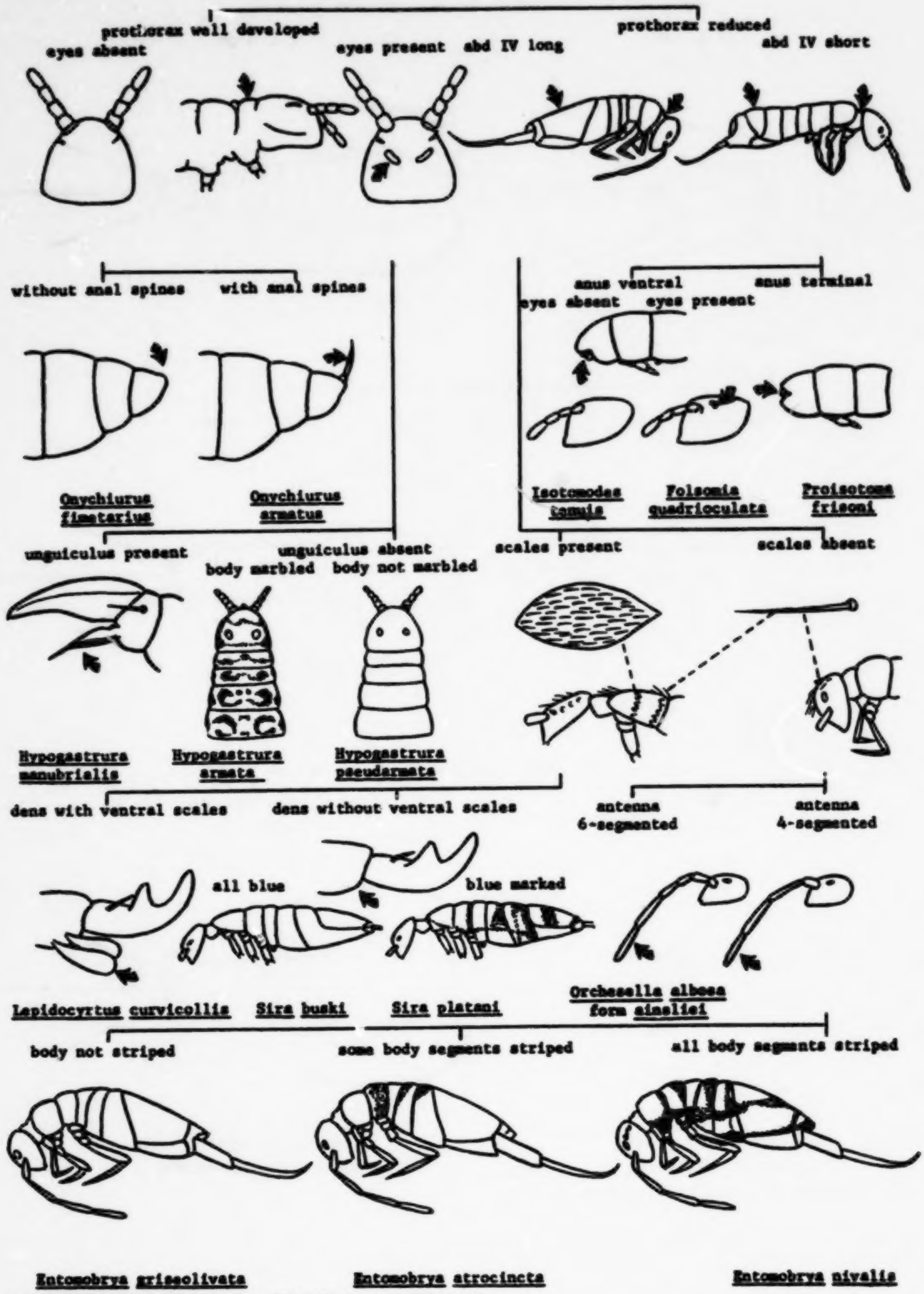
COLLEMBOLA: PICTORIAL KEY TO COMMON DOMESTIC SPECIES

Harold George Scott, and Chester J. Stojanovich


prothorax well developed
prothorax reduced
eyes absent
eyes present
abd IV long
abd IV short
without anal spines
with anal spines
Onychiurus fimetarius
Onychiurus armatus
anus ventral
anus terminal
eyes absent
eyes present
Isotomodes tenuis
Folsomia quadrioculata
Proisotoma frisoni
unguiculus present
unguiculus absent
body marbled
body not marbled
Hypogastrura manubrialis
Hypogastrura armata
Hypogastrura pseudarmata
scales present
scales absent
dens with ventral scales
dens without ventral scales
all blue
blue marked
antenna 6-segmented
antenna 4-segmented
Lepidocyrtus curvicollis
Sira buski
Sira platani
Orchesella albosa form ainsliei
body not striped
some body segments striped
all body segments striped
Entomobrya griseolivata
Entomobrya atrocincta
Entomobrya nivalis

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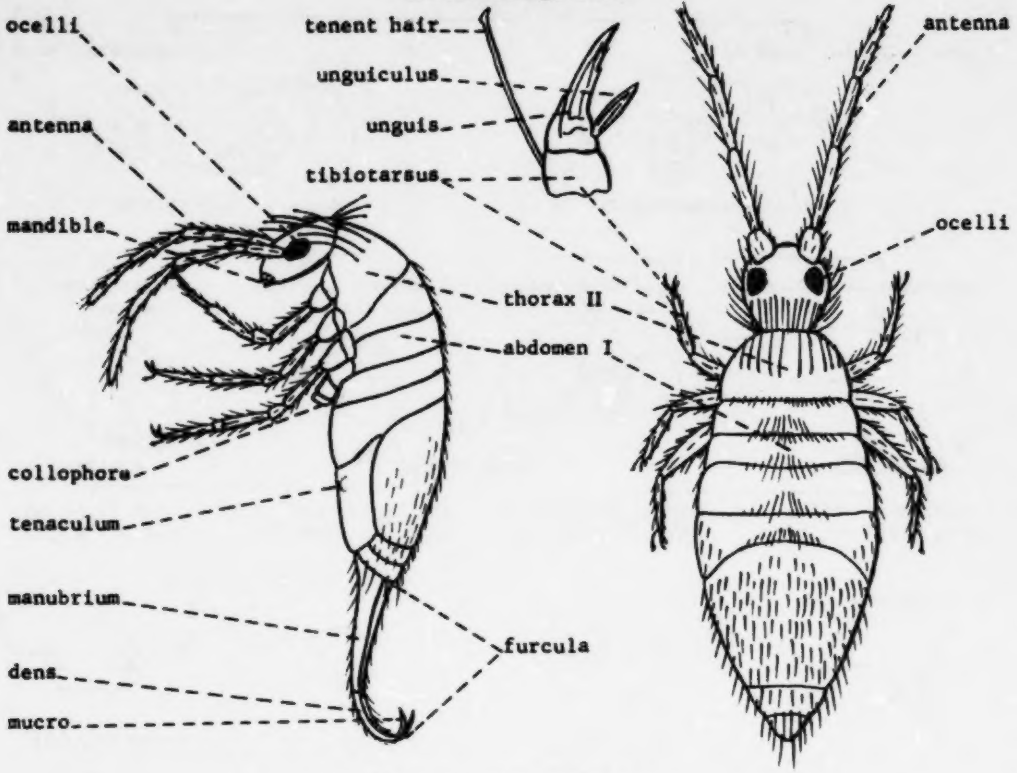
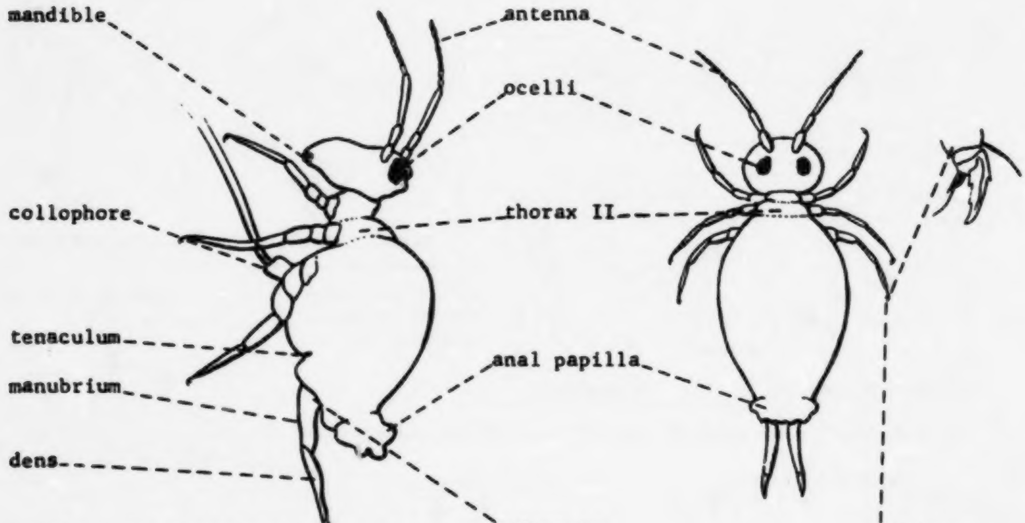
COLLEMBOLA DIAGRAMS

Harold George Scott


ocelli
antenna
mandible
tenent hair
unguiculus
unguis
tibiotarsus
thorax II
abdomen I
collophore
tenaculum
manubrium
furcula
dens
mucro
antenna
ocelli

SUBORDER ARTHROPLEONA


mandible
antenna
ocelli
collophore
thorax II
tenaculum
anal papilla
manubrium
dens
mucro
furcula
tibiotarsus

SUBORDER SYMPHYPLEONA

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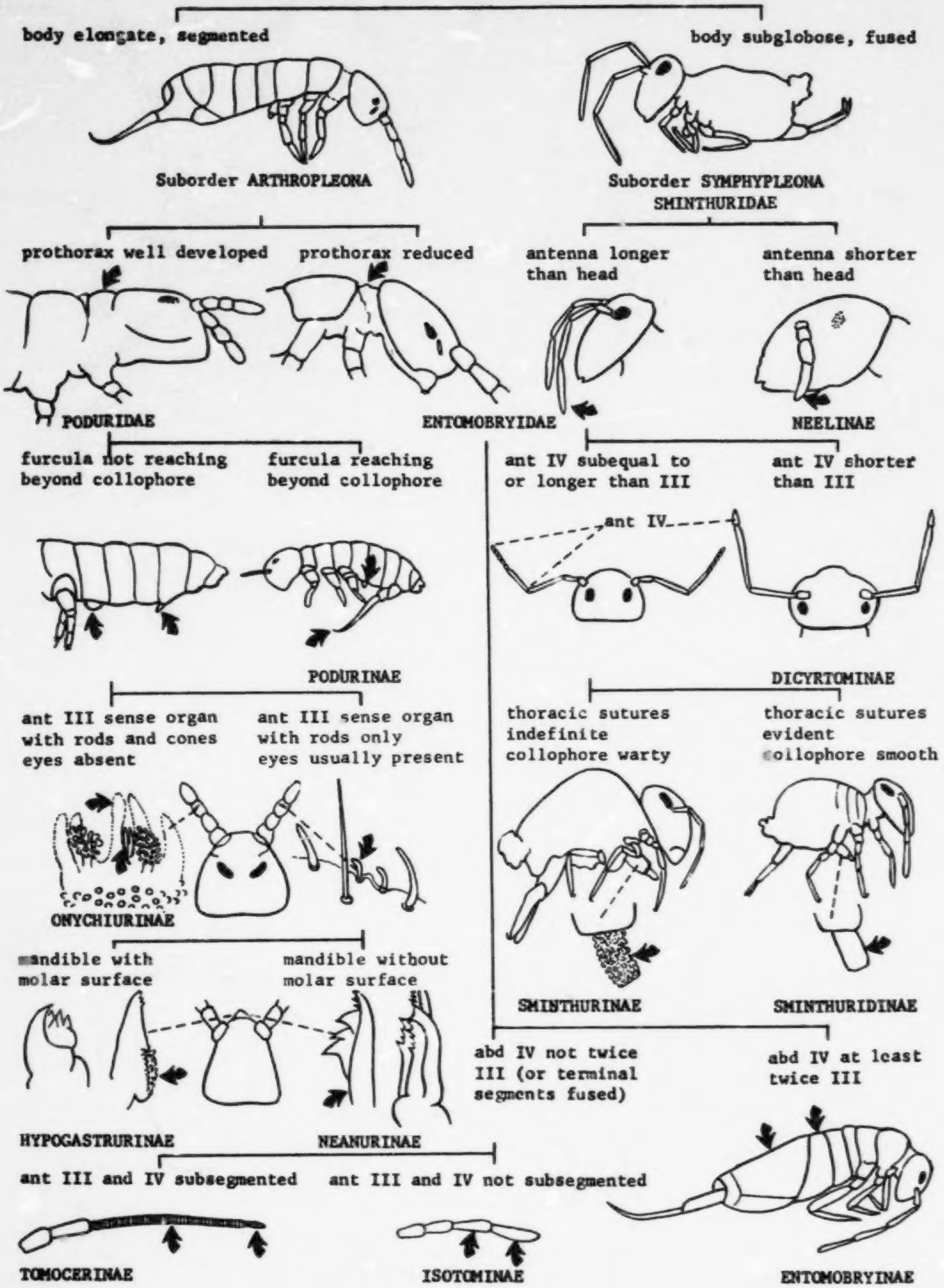
COLLEMBOLA: PICTORIAL KEY TO WORLD SUBFAMILIES

Harold George Scott, Ph.D.



body elongate, segmented

Suborder ARTHROPLEONA

body subglobose, fused

Suborder SYMPHYPLEONA
SMINTHURIDAE

prothorax well developed

PODURIDAE

prothorax reduced

ENTOMOBRYIDAE

antenna longer than head

antenna shorter than head

NEELINAE

furcula not reaching beyond collophore

furcula reaching beyond collophore

PODURINAE

ant IV subequal to or longer than III

ant IV shorter than III

DICYRTOMINAE

ant IV

ant III sense organ with rods and cones eyes absent

ONYCHIURINAE

ant III sense organ with rods only eyes usually present

thoracic sutures indefinite collophore warty

SMINTHURINAE

thoracic sutures evident collophore smooth

SMINTHURIDINAE

mandible with molar surface

HYPOGASTRURINAE

mandible without molar surface

NEANURINAE

abd IV not twice III (or terminal segments fused)

abd IV at least twice III

ENTOMOBRYINAE

ant III and IV subsegmented

TOMOCERINAE

ant III and IV not subsegmented

ISOTOMINAE

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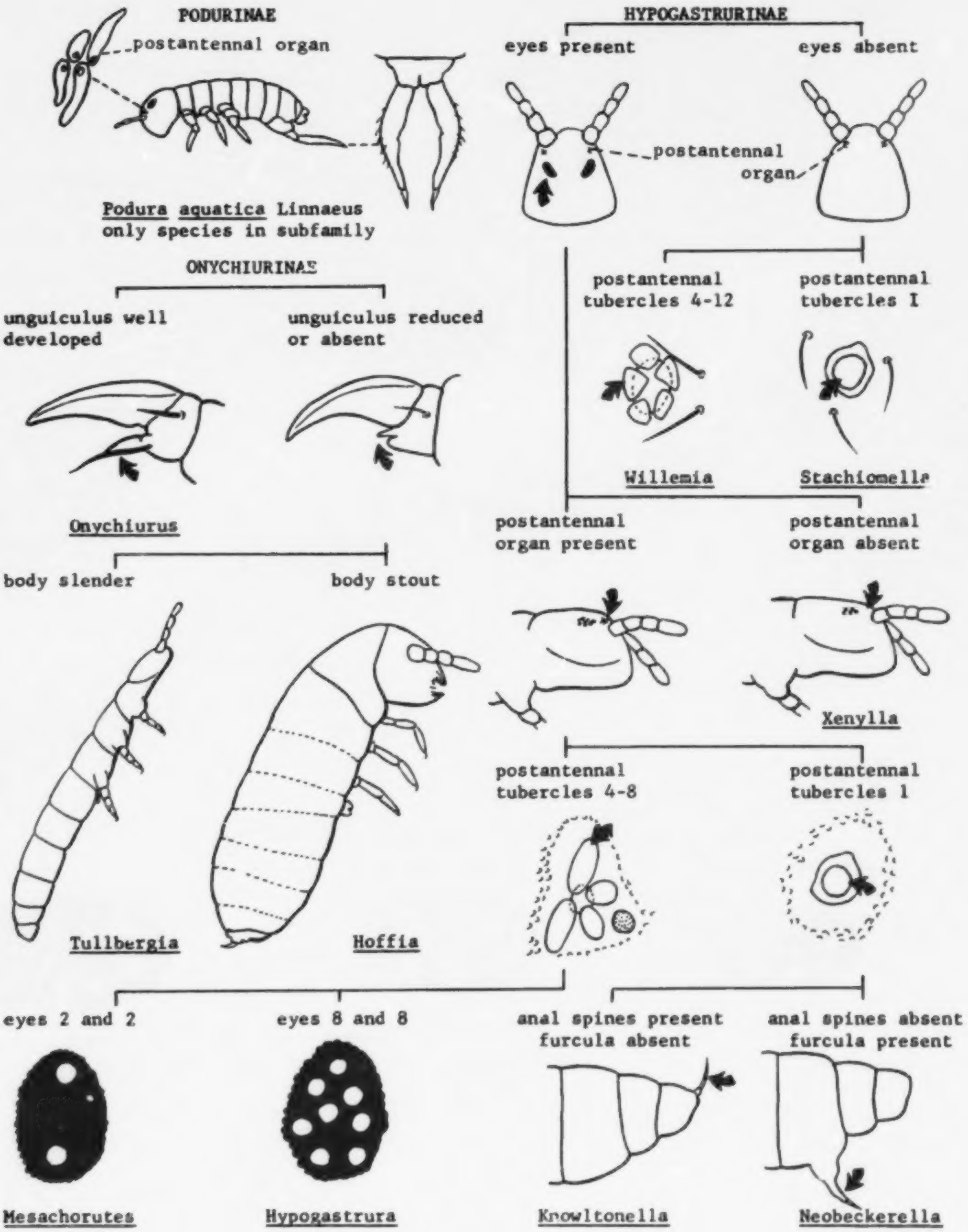
COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA

Harold George Scott, Ph.D.

SUBFAMILIES PODURINAE, HYPOGASTRURINAE, AND ONYCHIURINAE


PODURINAE
postantennal organ
Podura aquatica Linnaeus
only species in subfamily
HYPOGASTRURINAE
eyes present
eyes absent
postantennal
organ
ONYCHIURINAE
unguiculus well
developed
unguiculus reduced
or absent
Onychiurus
postantennal
tubercles 4-12
postantennal
tubercles 1
Willemia
Stachiomella
body slender
body stout
postantennal
organ present
postantennal
organ absent
Xenylla
Tullbergia
Hoffia
postantennal
tubercles 4-8
postantennal
tubercles 1
eyes 2 and 2
eyes 8 and 8
anal spines present
furcula absent
anal spines absent
furcula present
Mesachorutes
Hypogastrura
Knowltonella
Neobeckerella

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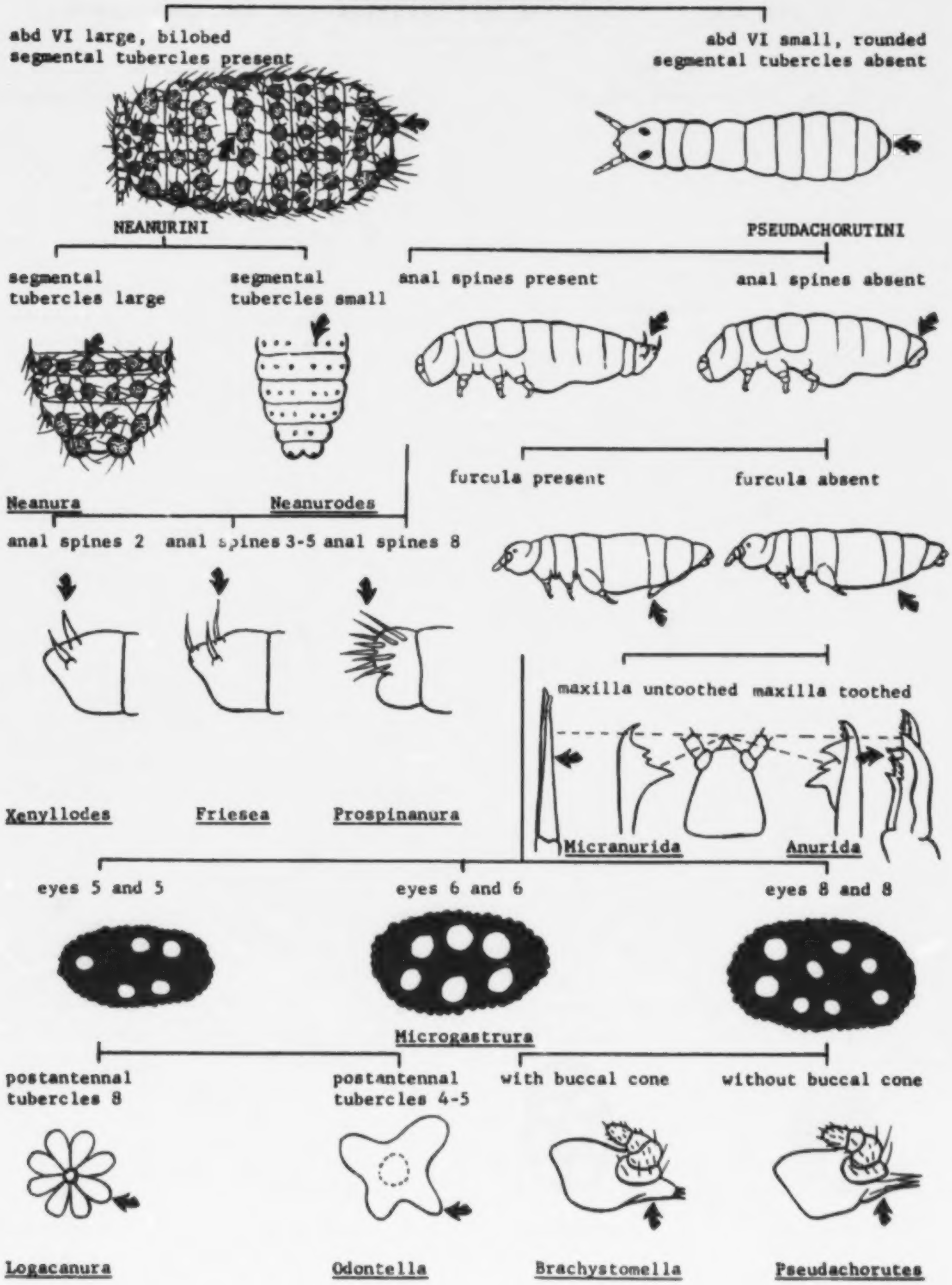
COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA

Harold George Scott, Ph.D.

SUBFAMILY NEANURINAE


abd VI large, bilobed
segmental tubercles present
abd VI small, rounded
segmental tubercles absent
NEANURINI
PSEUDACHORUTINI
segmental tubercles large
segmental tubercles small
anal spines present
anal spines absent
Neanura
Neanurodes
furcula present
furcula absent
anal spines 2
anal spines 3-5
anal spines 8
maxilla untoothed
maxilla toothed
Xenyllodes
Friesea
Prospinanura
Micranurida
Anurida
eyes 5 and 5
eyes 6 and 6
eyes 8 and 8
Microgastrura
postantennal tubercles 8
postantennal tubercles 4-5
with buccal cone
without buccal cone
Logacanura
Odontella
Brachystomella
Pseudachorutes

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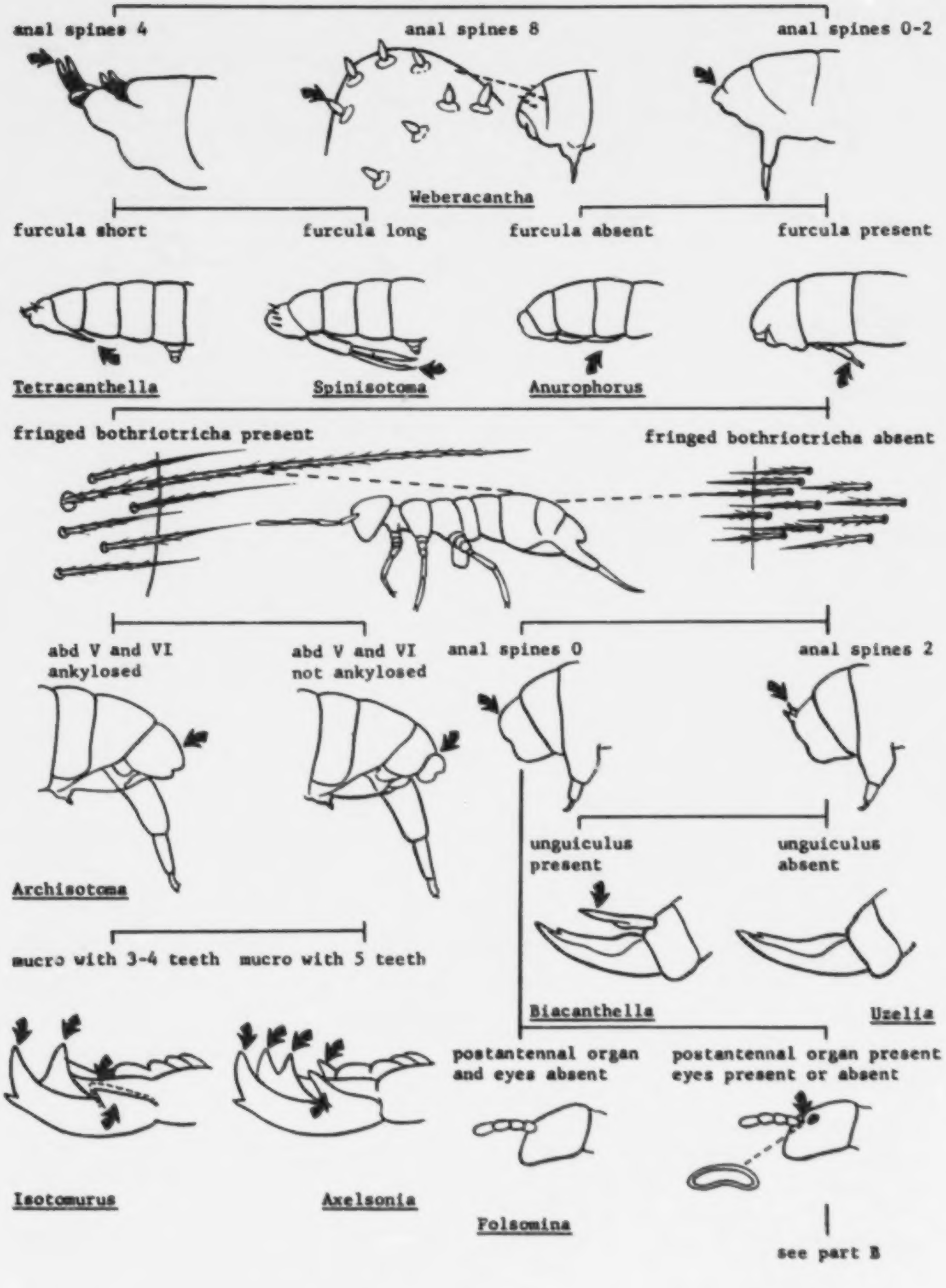
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1961

COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA

Harold George Scott, Ph.D.

SUBFAMILY ISOTOMINAE - Part A


anal spines 4
anal spines 8
anal spines 0-2
Weberacantha
furcula short
furcula long
furcula absent
furcula present
Tetracanthella
Spinisotoma
Anurophorus
fringed bothriotricha present
fringed bothriotricha absent
abd V and VI ankylosed
abd V and VI not ankylosed
anal spines 0
anal spines 2
Archisotoma
unguiculus present
unguiculus absent
Biacanthella
Uzelia
mucro with 3-4 teeth
mucro with 5 teeth
Isotomurus
Axelsonia
postantennal organ and eyes absent
postantennal organ present eyes present or absent
Folsomina
see part B

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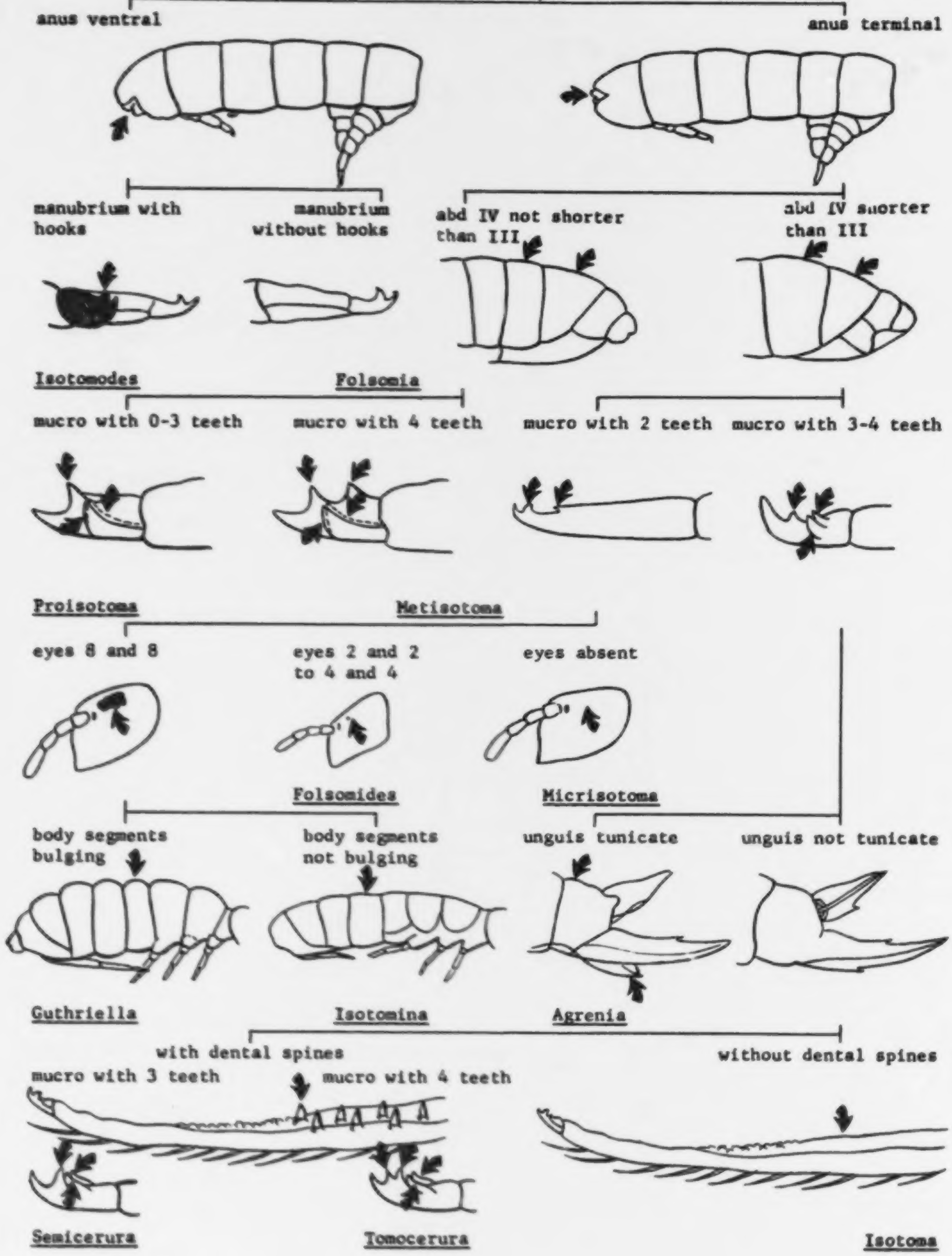
COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA

SUBFAMILY ISOTOMINAE - Part B

continued from part A


anus ventral
anus terminal
manubrium with hooks
manubrium without hooks
abd IV not shorter than III
abd IV shorter than III
Isotomodes
Folsomia
mucro with 0-3 teeth
mucro with 4 teeth
mucro with 2 teeth
mucro with 3-4 teeth
Proisotoma
Metisotoma
eyes 8 and 8
eyes 2 and 2 to 4 and 4
eyes absent
Folsomides
Micrisotoma
body segments bulging
body segments not bulging
unguis tunicate
unguis not tunicate
Guthriella
Isotomina
Agrenia
with dental spines
without dental spines
mucro with 3 teeth
mucro with 4 teeth
Semicerura
Tomocerura
Isotoma

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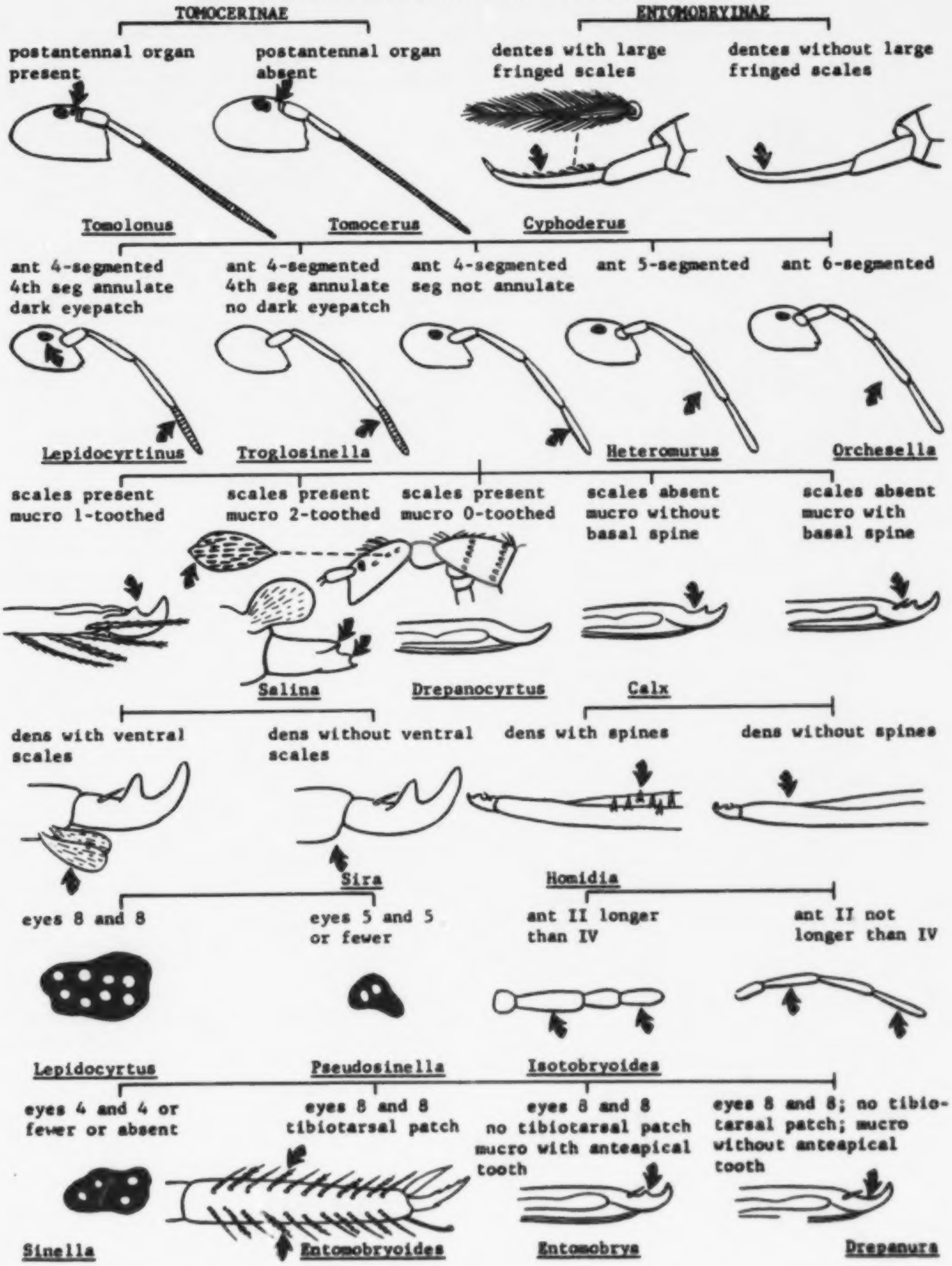
COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA

Harold George Scott, Ph.D.

SUBFAMILIES TOMOCERINAE AND ENTOMOBRYINAE



TOMOCERINAE

postantennal organ present — Tomolonus

postantennal organ absent — Tomocerus

ENTOMOBRYINAE

dentes with large fringed scales — Cyphoderus

dentes without large fringed scales

ant 4-segmented 4th seg annulate dark eyepatch — Lepidocyrtinus

ant 4-segmented 4th seg annulate no dark eyepatch — Troglosinella

ant 4-segmented seg not annulate

ant 5-segmented — Heteromurus

ant 6-segmented — Orchesella

scales present mucro 1-toothed

scales present mucro 2-toothed — Salina

scales present mucro 0-toothed — Drepanocyrtus

scales absent mucro without basal spine — Calx

scales absent mucro with basal spine

dens with ventral scales

dens without ventral scales — Sira

dens with spines — Homidia

dens without spines

eyes 8 and 8 — Lepidocyrtus

eyes 5 and 5 or fewer — Pseudosinella

ant II longer than IV — Isotobryoides

ant II not longer than IV

eyes 4 and 4 or fewer or absent — Sinella

eyes 8 and 8 tibiotarsal patch — Entomobryoides

eyes 8 and 8 no tibiotarsal patch mucro with anteapical tooth — Entomobrya

eyes 8 and 8; no tibiotarsal patch; mucro without anteapical tooth — Drepanura

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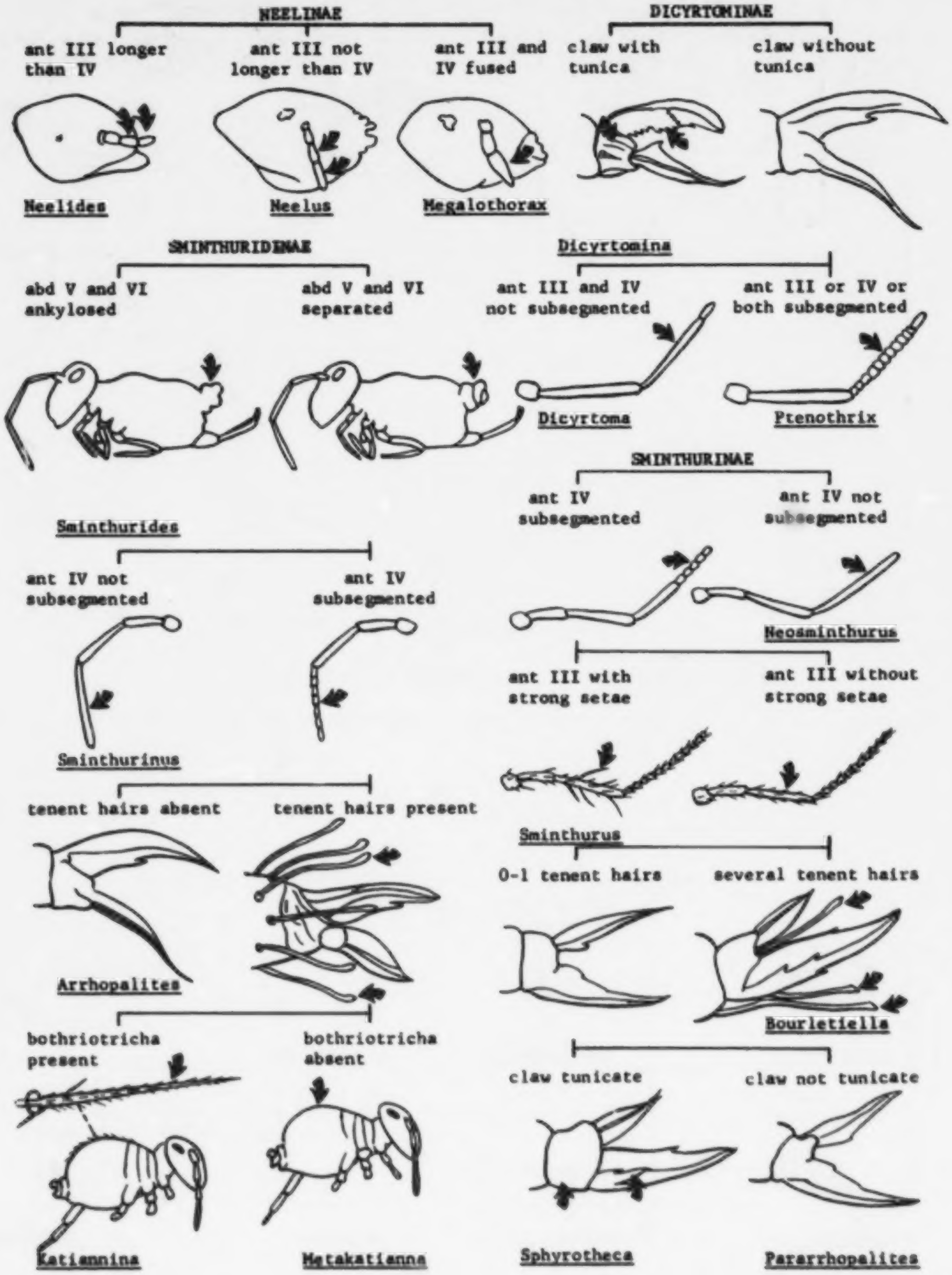
COLLEMBOLA: PICTORIAL KEY TO NEARCTIC GENERA

Harold George Scott, Ph.D.

FAMILY SMINTHURIDAE


NEELINAE
ant III longer than IV
ant III not longer than IV
ant III and IV fused
Neelides
Neelus
Megalothorax
DICYRTOMINAE
claw with tunica
claw without tunica
SMINTHURIDINAE
abd V and VI ankylosed
abd V and VI separated
Dicyrtomina
ant III and IV not subsegmented
ant III or IV or both subsegmented
Dicyrtoma
Ptenothrix
SMINTHURINAE
ant IV subsegmented
ant IV not subsegmented
Sminthurides
ant IV not subsegmented
ant IV subsegmented
Neosminthurus
ant III with strong setae
ant III without strong setae
Sminthurinus
tenent hairs absent
tenent hairs present
Sminthurus
0-1 tenent hairs
several tenent hairs
Arrhopalites
Bourletiella
bothriotricha present
bothriotricha absent
claw tunicate
claw not tunicate
Katiannina
Metakatianna
Sphyrotheca
Pararrhopalites

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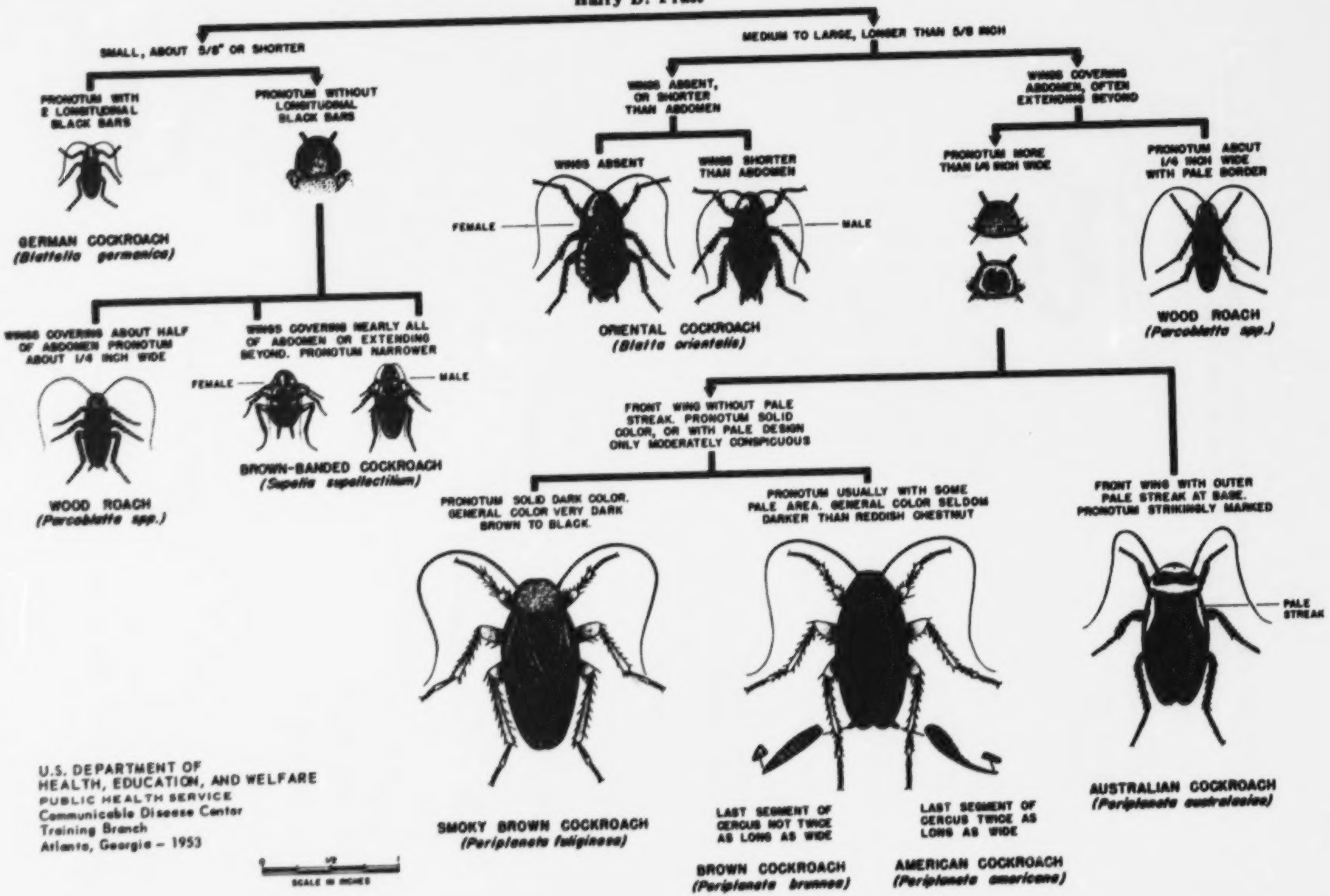
COCKROACHES: PICTORIAL KEY TO SOME COMMON SPECIES

Harry D. Pratt


SMALL, ABOUT 5/8" OR SHORTER
MEDIUM TO LARGE, LONGER THAN 5/8 INCH
PRONOTUM WITH 2 LONGITUDINAL BLACK BARS
PRONOTUM WITHOUT LONGITUDINAL BLACK BARS
GERMAN COCKROACH (Blattella germanica)
WINGS COVERING ABOUT HALF OF ABDOMEN PRONOTUM ABOUT 1/4 INCH WIDE
WINGS COVERING NEARLY ALL OF ABDOMEN OR EXTENDING BEYOND. PRONOTUM NARROWER
WOOD ROACH (Parcoblatta spp.)
FEMALE
MALE
BROWN-BANDED COCKROACH (Supella supellectilium)
WINGS ABSENT, OR SHORTER THAN ABDOMEN
WINGS COVERING ABDOMEN, OFTEN EXTENDING BEYOND
WINGS ABSENT
WINGS SHORTER THAN ABDOMEN
FEMALE
MALE
ORIENTAL COCKROACH (Blatta orientalis)
PRONOTUM MORE THAN 1/4 INCH WIDE
PRONOTUM ABOUT 1/4 INCH WIDE WITH PALE BORDER
WOOD ROACH (Parcoblatta spp.)
FRONT WING WITHOUT PALE STREAK. PRONOTUM SOLID COLOR, OR WITH PALE DESIGN ONLY MODERATELY CONSPICUOUS
FRONT WING WITH OUTER PALE STREAK AT BASE. PRONOTUM STRIKINGLY MARKED
PRONOTUM SOLID DARK COLOR. GENERAL COLOR VERY DARK BROWN TO BLACK.
PRONOTUM USUALLY WITH SOME PALE AREA. GENERAL COLOR SELDOM DARKER THAN REDDISH CHESTNUT
PALE STREAK
SMOKY BROWN COCKROACH (Periplaneta fuliginosa)
LAST SEGMENT OF CERCUS NOT TWICE AS LONG AS WIDE
LAST SEGMENT OF CERCUS TWICE AS LONG AS WIDE
BROWN COCKROACH (Periplaneta brunnea)
AMERICAN COCKROACH (Periplaneta americana)
AUSTRALIAN COCKROACH (Periplaneta australasiae)
0
1/2
1
SCALE IN INCHES

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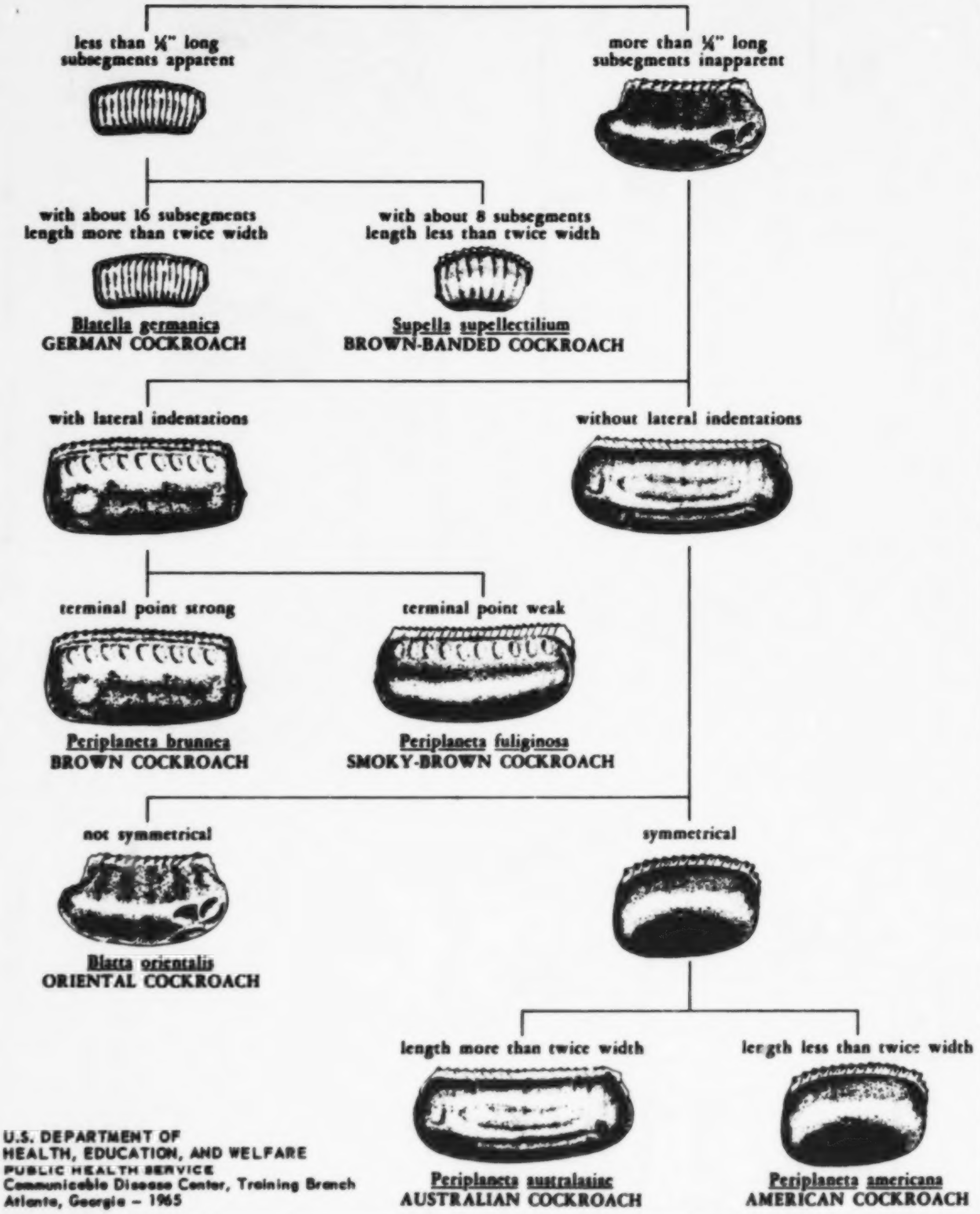
Communicable Disease Center
Training Branch
Atlanta, Georgia – 1953

COCKROACHES: KEY TO EGG CASES OF COMMON DOMESTIC SPECIES

Harold George Scott, Ph.D. and Margery R. Borom


less than ¼" long
subsegments apparent
more than ¼" long
subsegments inapparent
with about 16 subsegments
length more than twice width
with about 8 subsegments
length less than twice width
Blatella germanica
GERMAN COCKROACH
Supella supellectilium
BROWN-BANDED COCKROACH
with lateral indentations
without lateral indentations
terminal point strong
terminal point weak
Periplaneta brunnea
BROWN COCKROACH
Periplaneta fuliginosa
SMOKY-BROWN COCKROACH
not symmetrical
symmetrical
Blatta orientalis
ORIENTAL COCKROACH
length more than twice width
length less than twice width
Periplaneta australasiae
AUSTRALIAN COCKROACH
Periplaneta americana
AMERICAN COCKROACH

U.S. DEPARTMENT OF
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PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch
Atlanta, Georgia – 1965

COCKROACHES: KEY TO SOME COMMON SPECIES FOUND IN THE UNITED STATES

Harry D. Pratt & Chester J. Stojanovich

1. Middle and hind femora both with numerous strong spines along the ventral margin (Fig. 1 A)..2

   Middle and hind femora without strong spines along the ventral margin (Fig. 1 B)............12

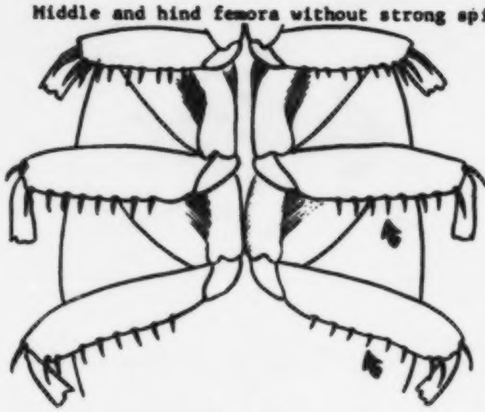

Fig. 1 A

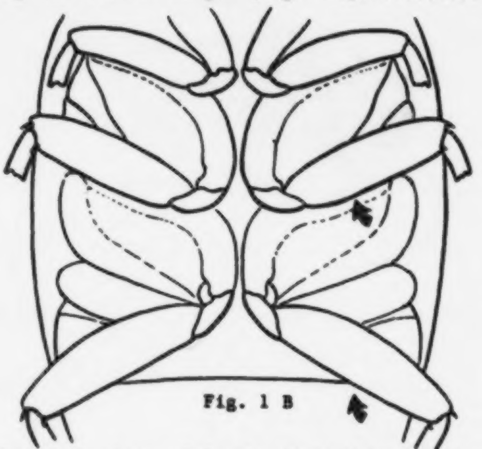

Fig. 1 B

2. Comparatively large species 18 mm. or longer; subgenital plate of female divided longitudinally, valvular (Fig. 2 A); male styli similar, slender, elongate and straight (Fig. 2 B).......3

   Species usually less than 18 mm. long; or, if longer, anterior-ventral margin of front femur with several large stout spines on basal portion, followed by a row of smaller spines (Fig. 2 C); female subgenital plate simple, not divided (Fig. 2 D); male styli variable, frequently modified, asymmetrical, or unequal in size (Fig. 2 E)..8

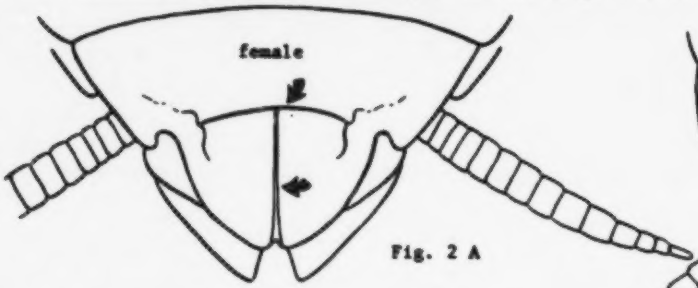

Fig. 2 A

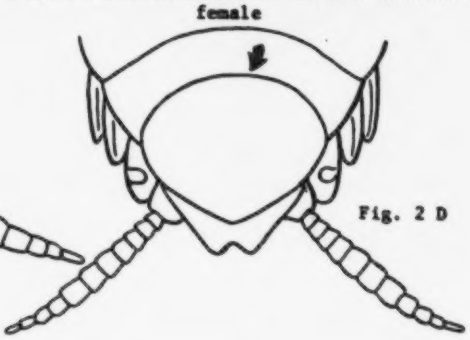

Fig. 2 D

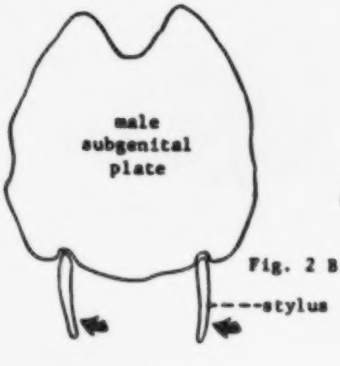

Fig. 2 B

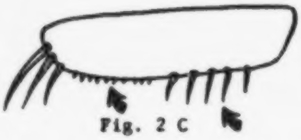

Fig. 2 C

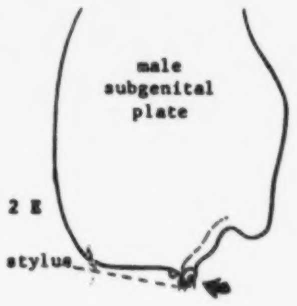

Fig. 2 E

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3. Front wing in both sexes extending beyond tip of abdomen (Fig. 3 A)..........................4

Front wing in both sexes not reaching tip of abdomen (Fig. 3 B)..............................7

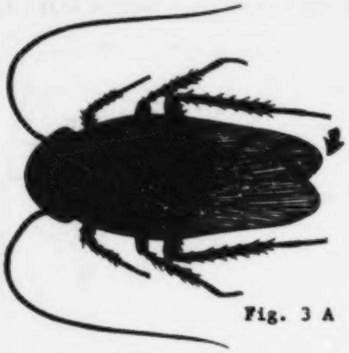


Fig. 3 A

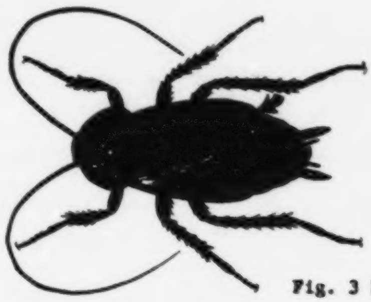


Fig. 3 B

4. Uniformly dark blackish-brown, shining species (Fig. 4 A).......................................
....(*Periplaneta fuliginosa*) SMOKY BROWN COCKROACH

Species with some yellowish markings on pronotum or front wing or both (Fig. 4 B)...........5

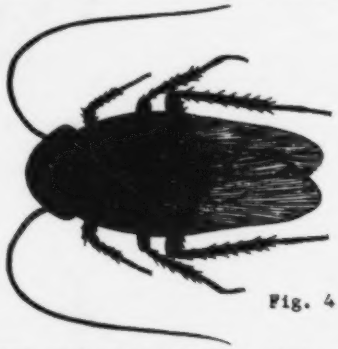


Fig. 4 A

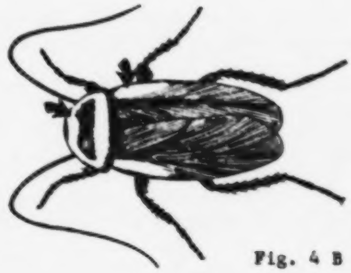
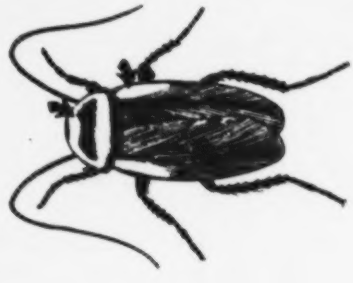


Fig. 4 B

5. Front wing with yellowish stripe; pronotum with yellowish and darker areas very contrastingly marked (Fig. 5 A)............................(*Periplaneta australasiae*) AUSTRALIAN COCKROACH

Front wing entirely brownish; pronotum with yellowish and darker areas less contrastingly marked (Fig. 5 B)..6



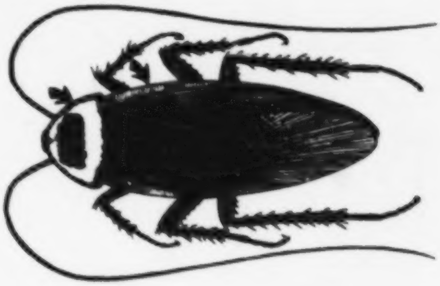


Fig. 5 A

Fig. 5 B

6. Styli very long and slender, longer than space between their bases (Fig. 6 A); cercus long and slender particularly in the male; male supra-anal plate deeply notched (Fig. 6 B)...(Periplaneta americana) AMERICAN COCKROACH

Styli shorter, not as long as space between their bases (Fig. 6 C); cercus stouter and more evenly spindle-shaped; male supra-anal plate truncate or feebly notched (Fig. 6 D)...(Periplaneta brunnea) BROWN COCKROACH

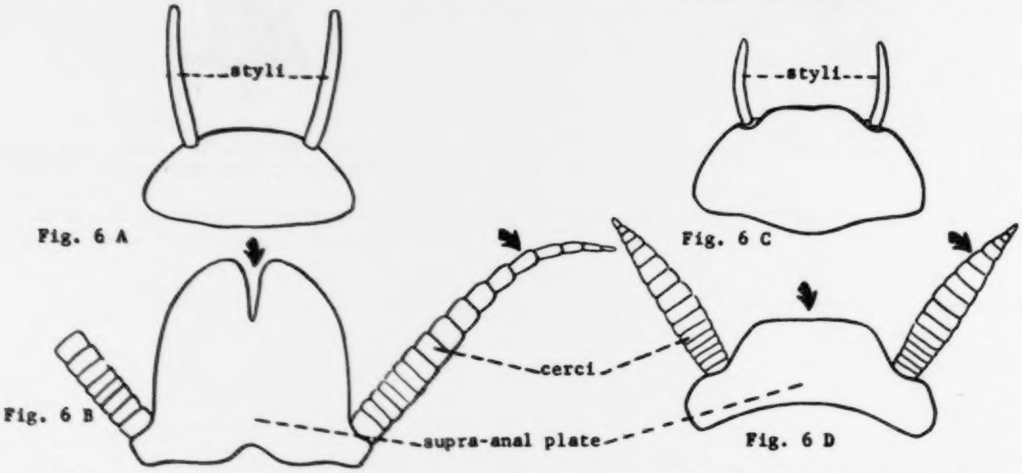


Fig. 6 A

Fig. 6 B

Fig. 6 C

Fig. 6 D

7. Blackish species, 15-27 mm. long; male front wings covering two-thirds of abdomen (Fig. 7 A); female front wings widely separated pads (Fig. 7 B); first segment of hind tarsus longer than segments 2-5 combined, pulvilli of second and third segments small (Fig. 7 C)...(Blatta orientalis) ORIENTAL COCKROACH

Mahogany brownish species, 30-40 mm. long; front wings reduced to short pads, not widely separated (Fig. 7 D); first segment of hind tarsus shorter than segments 2-5 combined, pulvilli of second and third segments large (Fig. 7 E)....(Eurycotis floridana) LARGE FLORIDA COCKROACH

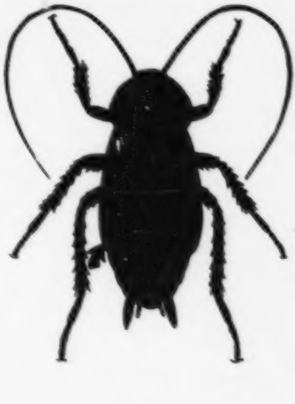


Fig. 7 A

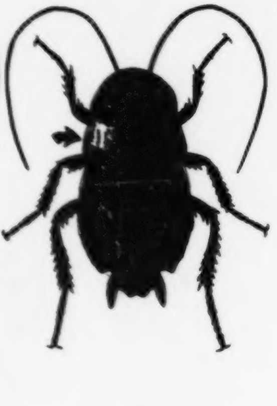


Fig. 7 B

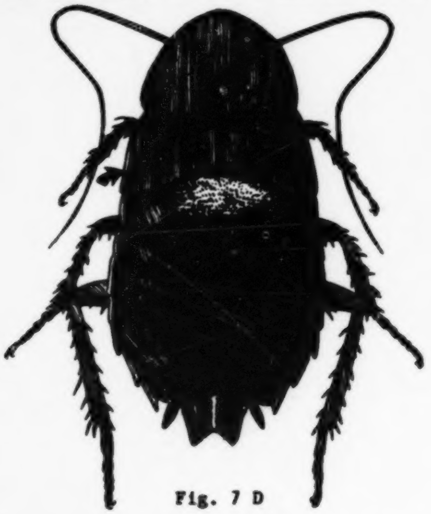


Fig. 7 D

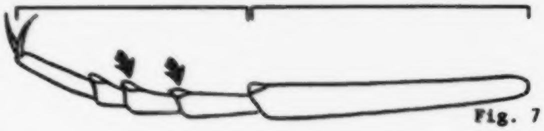


Fig. 7 C

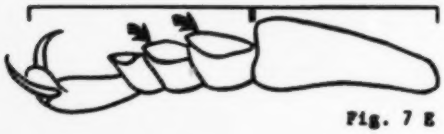


Fig. 7 E

8. Pronotum with two conspicuous longitudinal dark bars on a pale background (Fig. 8 A).........9

Pronotum variously marked, but without two conspicuous dark longitudinal bars (Fig. 8 B)....10

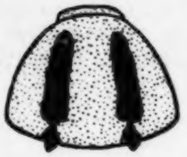


Fig. 8 A

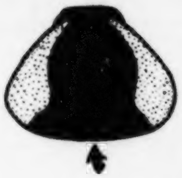


Fig. 8 B

9. Face pale (Fig. 9 A); male subgenital plate asymmetrical, styli very unequal, short and rounded (Fig. 9 B)...(Blattella germanica) GERMAN COCKROACH

Face dark; male subgenital plate almost symmetrical, styli somewhat elongate and subequal in size (Fig. 9 C)...(Blattella vaga) FIELD COCKROACH

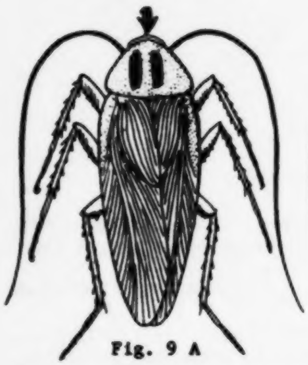


Fig. 9 A

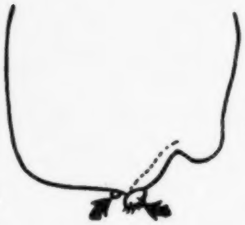


Fig. 9 B

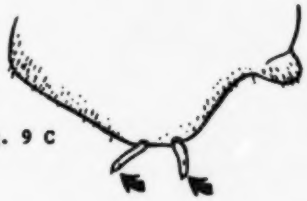


Fig. 9 C

10. Pronotum with a broad dark central stripe; front wings of both sexes appearing to have two transverse brownish bars, some pale specimens showing bars poorly (Fig. 10 A). Width of pronotum usually not exceeding 4.5 mm.............(Supella supellectilium) BROWN-BANDED COCKROACH

Pronotum and front wings otherwise, or, if pronotum is so marked, its width exceeding 4.5 mm. (Fig. 10 B)...11

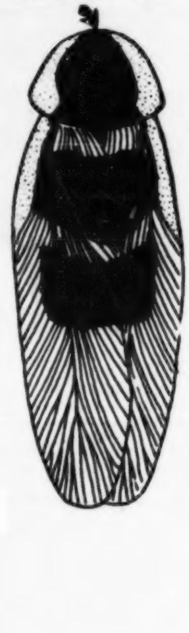


Fig. 10 A

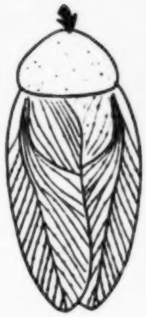


Fig. 10 B

11. Larger species 9-25 mm. or more in length; front wing without small dark spots in winged specimens (Fig. 11 A); claws equal (Fig. 11 B); ventral anterior margin of front femur with 3 long apical spines (Fig. 11 C)......................(Parcoblatta species) WOOD COCKROACHES

Small species, 8-9 mm. long; front wing with small dark spots (Fig. 11 D); claws unequal (Fig. 11 E); ventral anterior margin of front femur with 2 long apical spines (Fig. 11 F)... ....(Ectobius pallidus) SPOTTED MEDITERRANEAN COCKROACH

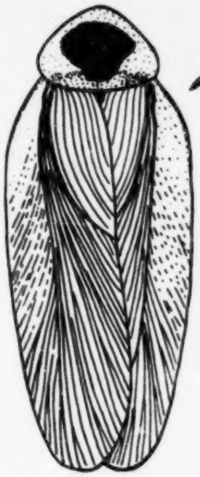


Fig. 11 A

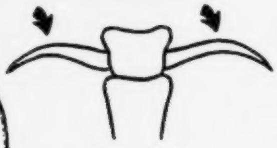


Fig. 11 B

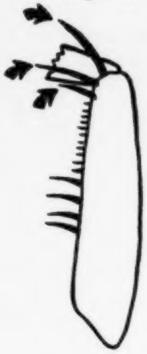


Fig. 11 C

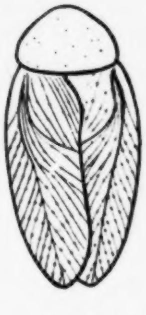


Fig. 11 D

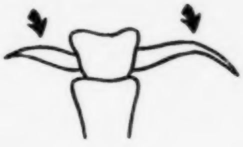


Fig. 11 E

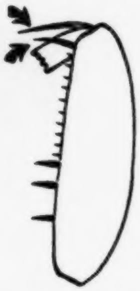


Fig. 11 F

12. Top of eyes close together (Fig. 12 A); general color a nearly uniform greenish; posterior margin of pronotum somewhat angularly produced (Fig. 12 B) (Panchlora nivea) CUBAN COCKROACH

Top of eyes sometimes distant (Fig. 12 C); general color various shades of brown and gray; pronotum usually not angularly produced posteriorly (Fig. 12 D)..........................13

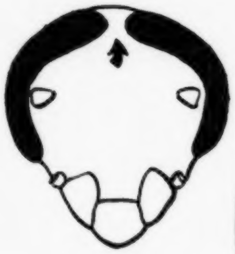


Fig. 12 A

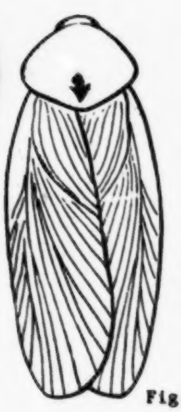


Fig. 12 B

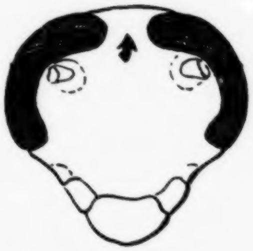


Fig. 12 C

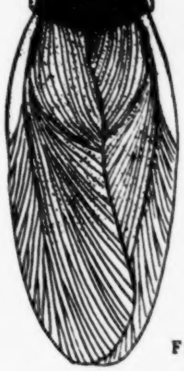


Fig. 12 D

13. Medium sized species, 30 mm. or less in length, including folded wings (Fig. 14 A & B)......14

Large species 40 mm. or more in length, including folded wings (Fig. 15 A & C).............15

14, Pronotum uniformly blackish except a narrow yellowish band along anterior and lateral margins (Fig. 14 A).....................................(*Pycnoscelus surinamensis*) SURINAM COCKROACH

Pronotum pale with a narrow dark longitudinal submarginal band on each side and irregular brownish blotches on disc (Fig. 14 B).................(*Nauphoeta cinerea*) CINEREOUS COCKROACH

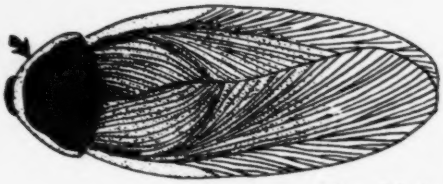


Fig. 14 A

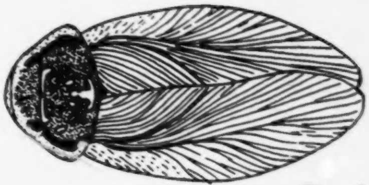


Fig. 14 B

15. Disc or pronotum with shield-like design, sometimes skull-like design (Fig. 15 A); front femur with one or more stout spurs on underside (Fig. 15 B)..(*Blaberus giganteus*; *Blaberus craniifer*) GIANT COCKROACH

Disc of pronotum with shield-like design darkened in outline only, not solid black (Fig. 15 C); front femur with a line of stiff hairs on anterior-ventral margin (Fig. 15 D)..(*Leucophaea maderae*) MADEIRA COCKROACH

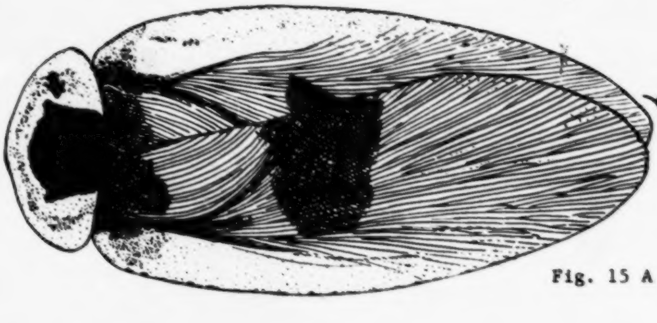


Fig. 15 A

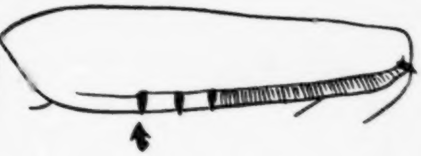


Fig. 15 B

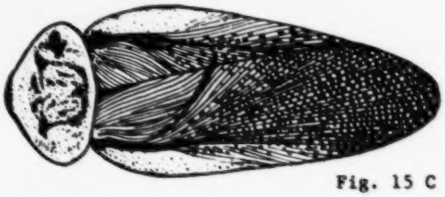


Fig. 15 C

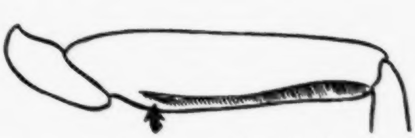


Fig. 15 D

TERMITES: KEY TO SOME COMMON NORTH AMERICAN SPECIES

Harold George Scott

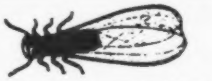


Fig. A - Winged Adult

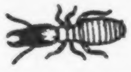


Fig. B - Soldier

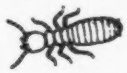


Fig. C - Worker

Key to Winged Adults

1. Radius without branches; fontanel (fig. E) usually present 2
Radius (fig. D) with branches; fontanel absent 4

2. Tibia (fig. F) slightly to plainly blackish 3
Tibia entirely pale; Ontario to Guatemala, west to Utah and Arizona
(*Reticulitermes flavipes*) .... EASTERN SUBTERRANEAN TERMITE

3. Tibia slightly darkened; length 9 mm.; British Columbia to Baja California, east to Idaho and Sonora
(*Reticulitermes hesperus*) .... WESTERN SUBTERRANEAN TERMITE
Tibia generally darkened; length 9.5- 10 mm.; Oregon and Montana to western Mexico, Missouri, and Texas
(*Reticulitermes tibialis*) .... ARID SUBTERRANEAN TERMITE

4. Ocelli (fig. E) present 5
Ocelli absent; western Canada to Baja California
(*Zootermopsis angusticollis*) .... WESTERN ROTTEN-WOOD TERMITE

5. Body yellow to light brown 6
Body blackish; California to Baja California, east to Arizona and Utah
(*Kalotermes minor*) .... WESTERN DRY-WOOD TERMITE

6. Transverse rows of long hairs on tergites; South Carolina to Florida, west to eastern Texas (*Kalotermes snyderi*) .... EASTERN DRY-WOOD TERMITE
No transverse rows of hairs on tergites; Arizona and California
(*Procryptotermes hubbardi*) .... ARID DRY-WOOD TERMITE

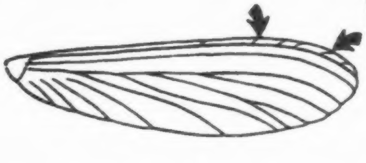


Fig. D - Wing

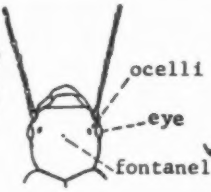


Fig. E - Head

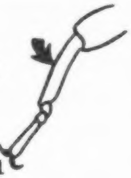


Fig. F - Leg

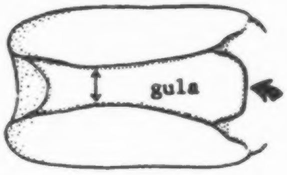


Fig. G - Throat

Key to Soldiers

1. Fontanel (fig. E) present; eyes usually absent 2
Fontanel absent; eyes (fig. E) present 4

2. Gula (fig. G) not twice as broad in front as in middle .... ARID SUBTERRANEAN TERMITE
Gula twice as broad in front as in middle 3

3. Head twice as long as broad .... WESTERN SUBTERRANEAN TERMITE
Head less than twice as long as broad .... EASTERN SUBTERRANEAN TERMITE

4. Antenna (fig. E) with 23-31 segments 5
Antenna with 10-20 segments .... WESTERN ROTTEN-WOOD TERMITE

5. Third antennal segment as long as next 3 combined .... EASTERN DRY-WOOD TERMITE
Third antennal segment shorter than next 3 combined .... WESTERN DRY-WOOD TERMITE
Third antennal segment as long as next 4 combined .... ARID DRY-WOOD TERMITE

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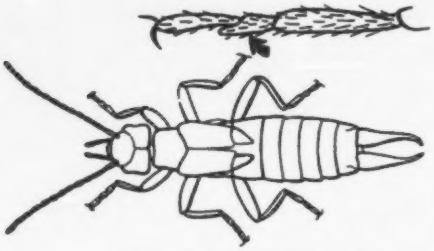
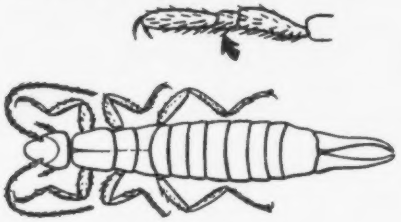
EARWIGS: PICTORIAL KEY TO COMMON DOMESTIC SPECIES

Chester J. Stojanovich and Harold George Scott

tarsus II prolonged beneath III

tarsus II not prolonged beneath III

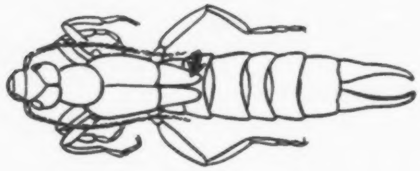


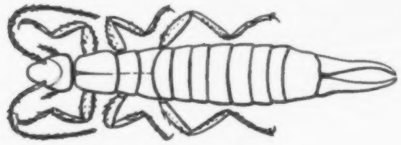


EUROPEAN EARWIG
Forficula auricularia

wings present

wings absent

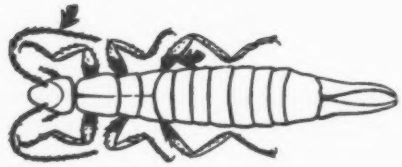




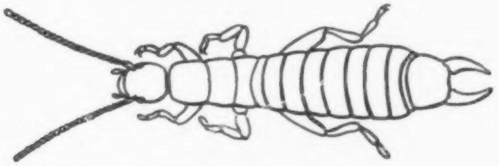
SHORE EARWIG
Labidura riparia

legs and antennae banded

legs and antennae not banded



RING-LEGGED EARWIG
Euborellia annulipes



SEASIDE EARWIG
Anisolabis maritima

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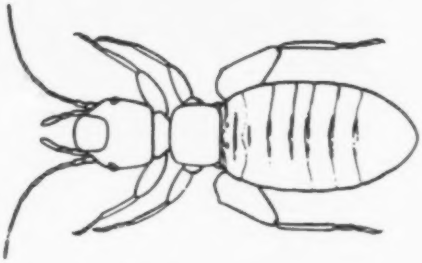
PSOCIDS: KEY TO SOME SPECIES COMMONLY INFESTING STORED FOOD

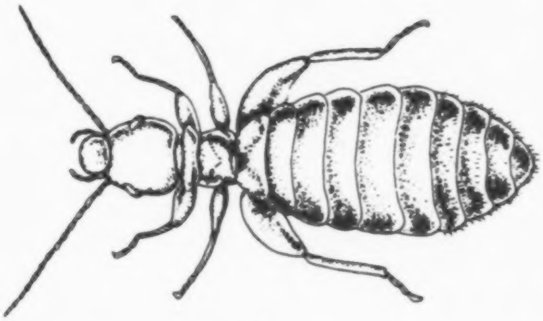
Harold George Scott and Chester J. Stojanovich

1.	Two distinct thoracic segments	2
	Three distinct thoracic segments (*Trogium pulsatorium*)	DEATH WATCH
2.	Without large pronotal bristles	3
	With large pronotal bristles	4
3.	Eye with 7 facets; head and body brown (*Liposcelis bostrychopilus*)	BANDED PSOCID
	Eye with 2–4 facets; head brown, body yellow (*Liposcelis paetus*)	WAREHOUSE PSOCID



Warehouse Psocid

4.	Two to 5 large pronotal bristles (*Liposcelis entomophilus*)	GRAIN PSOCID
	One large pronotal bristle (*Liposcelis terricolus*)	BOOK LOUSE



Book Louse

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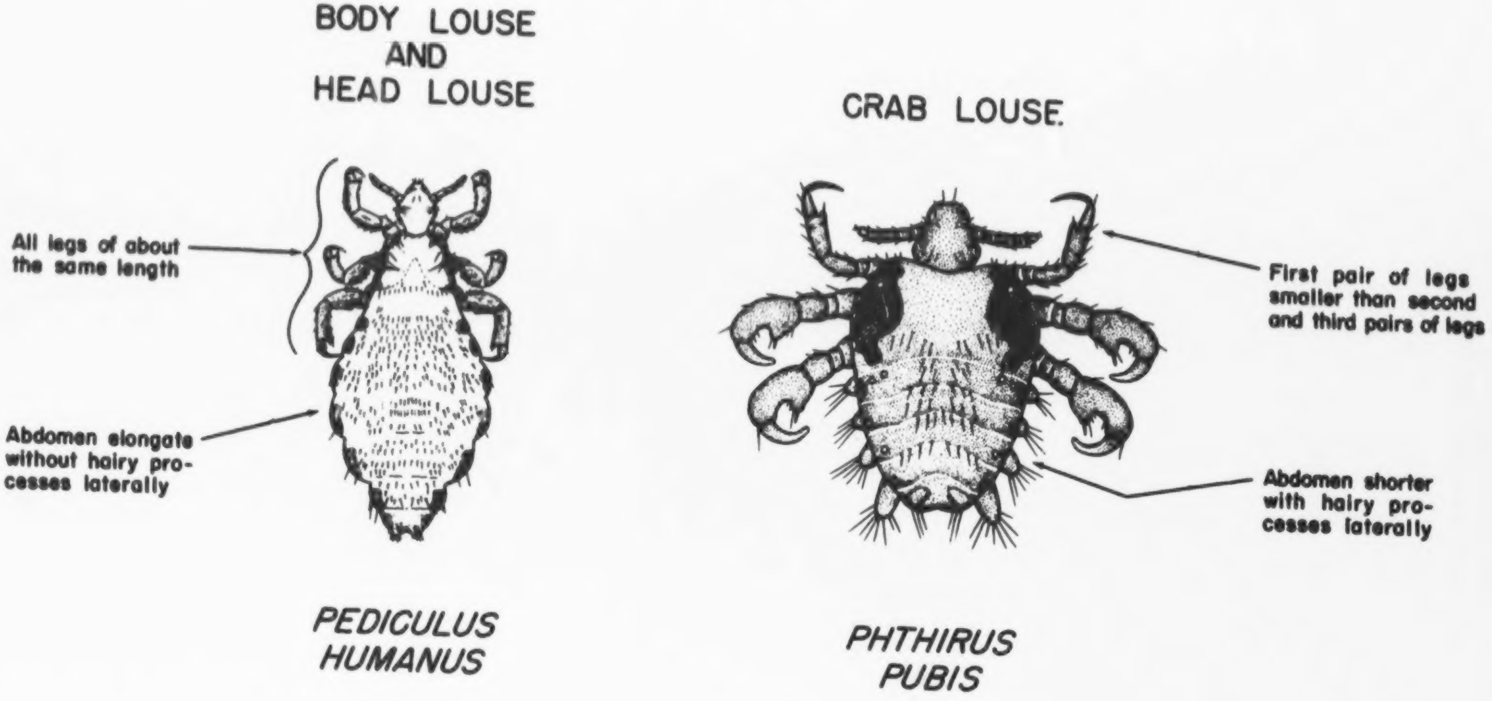
LICE COMMONLY FOUND ON MAN

Harry D. Pratt

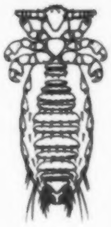

BODY LOUSE
AND
HEAD LOUSE
CRAB LOUSE
All legs of about the same length
Abdomen elongate without hairy processes laterally
First pair of legs smaller than second and third pairs of legs
Abdomen shorter with hairy processes laterally
PEDICULUS HUMANUS
PHTHIRUS PUBIS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – Revised Aug. 1953, Oct. 1948

ANOPLURA: PICTORIAL KEY TO SPECIES ON DOMESTIC RATS IN SOUTHERN UNITED STATES

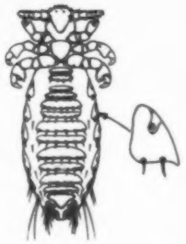
Roy F. Fritz and Harry D. Pratt

Abdomen with well defined ventral, lateral and dorsal plates



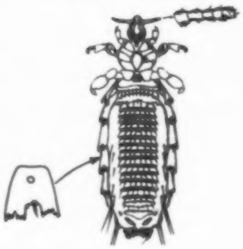
ADULTS

Lateral plates small, subtriangular. Segment II of antenna as long as wide

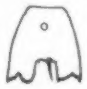


Polyplax spinulosa

Lateral plates large, emarginate posteriorly. Segment II of antenna longer than wide

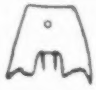


Lateral plates 4-6 with one large and one minute seta

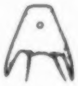


Hoplopleura oenomydis

Lateral plates 4-6 with two large setae

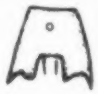


Lateral plates broadly emarginate; Apical processes thorn-like



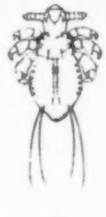
Hoplopleura hirsuta

Lateral plates narrowly emarginate; Apical processes broad



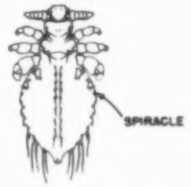
Hoplopleura acanthopus

Abdomen with plates poorly defined or absent



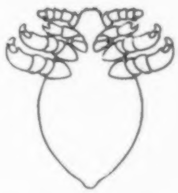
NYMPHS

Abdomen with spiracles and two parallel rows of setae



Polyplax spinulosa

Abdomen without spiracles or parallel rows of setae



Hoplopleura spp.

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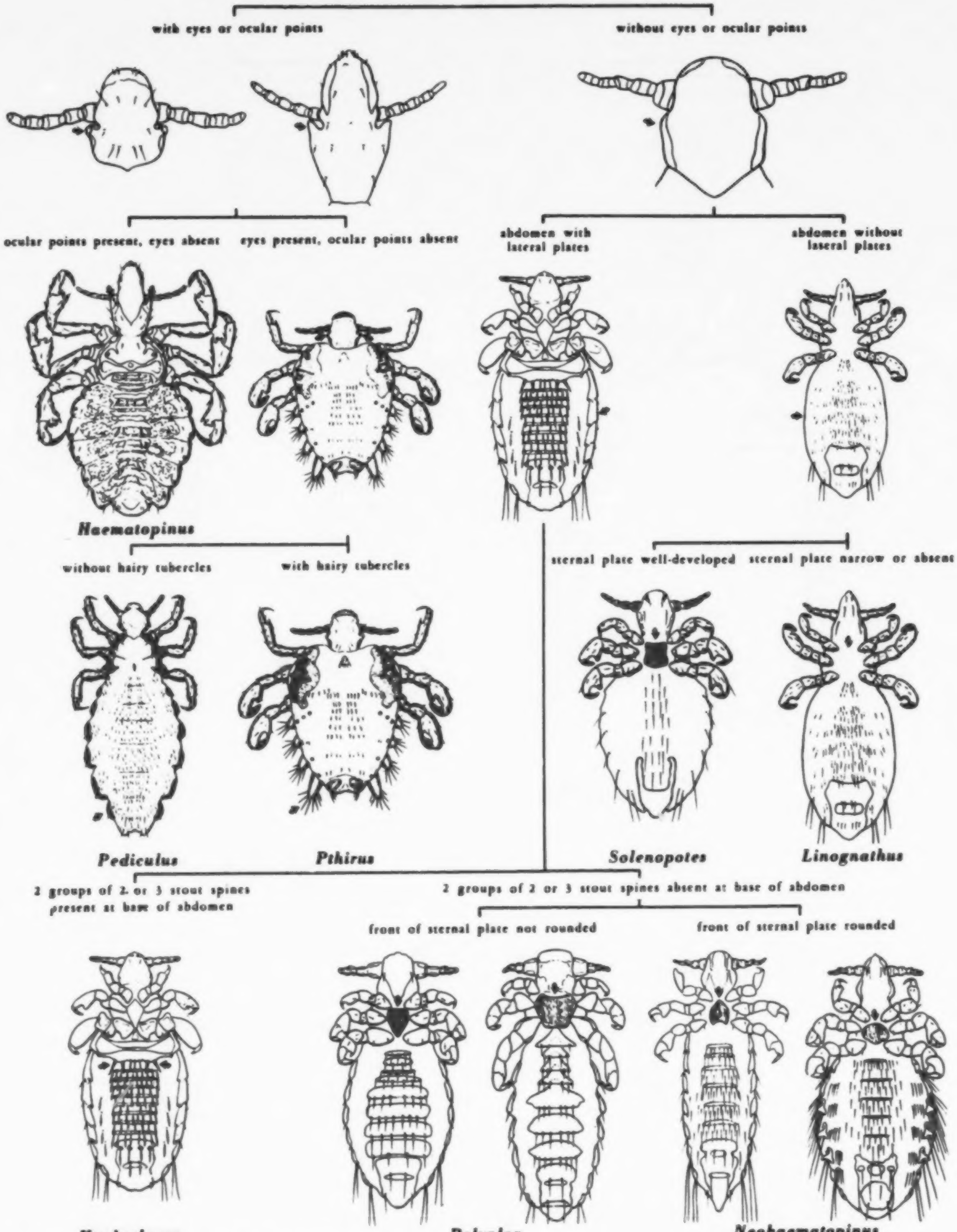
PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch
Atlanta, Georgia – 1947

ANOPLURA: PICTORIAL KEY TO SOME COMMON GENERA OF SUCKING LICE

Chester J. Stojanovich and Harry D. Pratt


with eyes or ocular points
without eyes or ocular points
ocular points present, eyes absent
eyes present, ocular points absent
abdomen with lateral plates
abdomen without lateral plates
Haematopinus
without hairy tubercles
with hairy tubercles
sternal plate well-developed
sternal plate narrow or absent
Pediculus
Pthirus
Solenopotes
Linognathus
2 groups of 2 or 3 stout spines present at base of abdomen
2 groups of 2 or 3 stout spines absent at base of abdomen
front of sternal plate not rounded
front of sternal plate rounded
Hoplopleura
Polyplax
Neohaematopinus

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

ANOPLURA: KEY TO NORTH AMERICAN SPECIES

Chester J. Stojanovich and Harry D. Pratt

Key to Families of Anoplura

1. Head and thorax more or less thickly covered with setae; in some species the setae are modified into scales (Fig. 1 A). On marine animals..........FAMILY ECHINOPHTHIRIIDAE

   Head and thorax with only a few setae (Fig. 1 B)....................................2

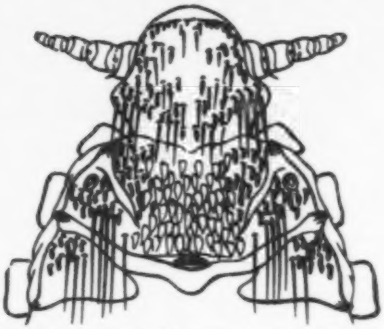


Fig. 1 A

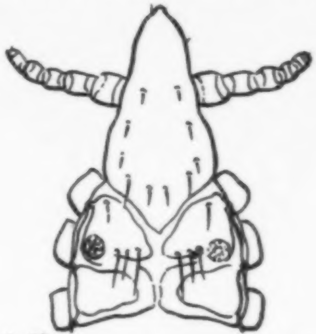


Fig. 1 B

2. Eyes present or with prominent ocular points (Fig. 2 A & B)........................3

   Eyes and ocular points absent (Fig. 2 C)...4

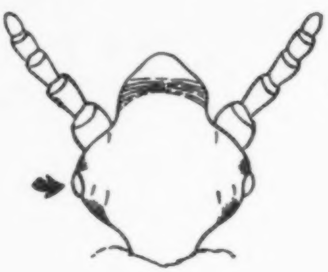


Fig. 2 A

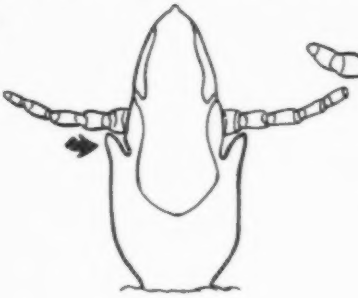


Fig. 2 B

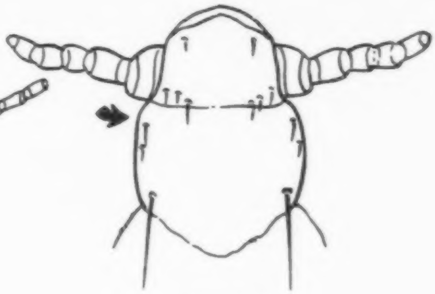


Fig. 2 C

3. Abdomen without irregular sclerotized plates on dorsum and venter (Fig. 3 A). On man. ....FAMILY PEDICULIDAE

   Abdomen with irregular sclerotized plates on dorsum and venter (Fig. 3 B). On hoofed animals...FAMILY HAEMATOPINIDAE

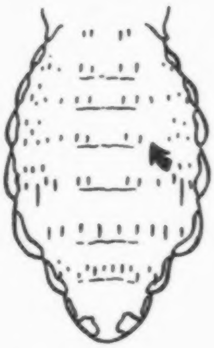


Fig. 3 A

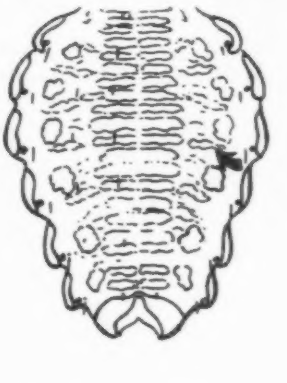


Fig. 3 B

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PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1965

4. Paratergal plates absent (Fig. 4 A). On hoofed animals or carnivores..FAMILY LINOGNATHIDAE

Paratergal plates present (Fig. 4 B). On rodents and lagomorphs...FAMILY HOPLOPLEURIDAE

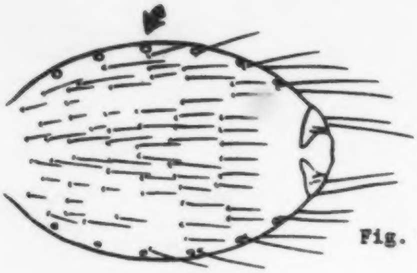


Fig. 4 A

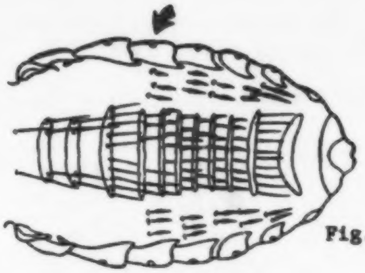


Fig. 4 B

Key to Genera of Echinophthiriidae

1. Antennae four-segmented; abdomen without scale-like setae (Fig. 1 A)........................2

Antennae five-segmented; abdomen with scale-like setae (Fig. 1 B).......Antarctophthirus

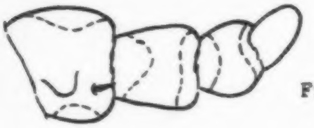


Fig. 1 A

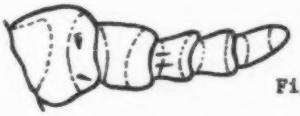


Fig. 1 B

2. Legs all essentially the same size (Fig. 2 A)......Echinophthirius horridus (von Olfers)

Anterior legs small; second and third legs stout (Fig. 2 B)..Proechinophthirus fluctus (Ferris)

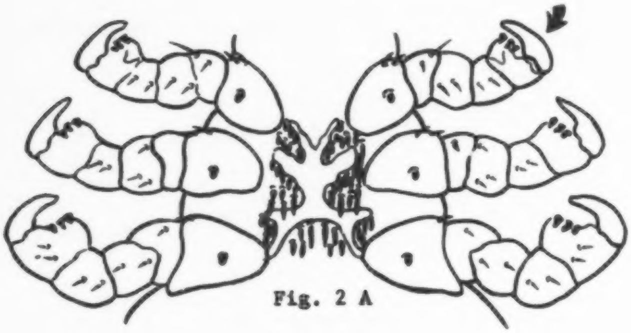


Fig. 2 A

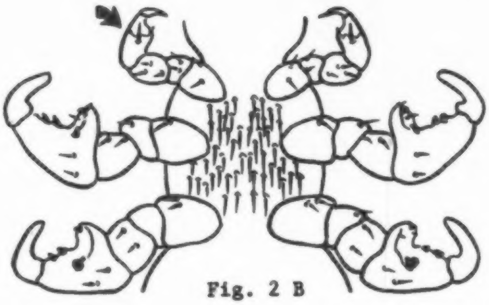


Fig. 2 B

Key to Species of Antarctophthirus

1. Scale-like setae present only on abdomen (Fig. 1 A). *Antarctophthirus callorhini* (Osborn)

   Scale-like setae present on thorax and abdomen (Fig. 1 B)............................2

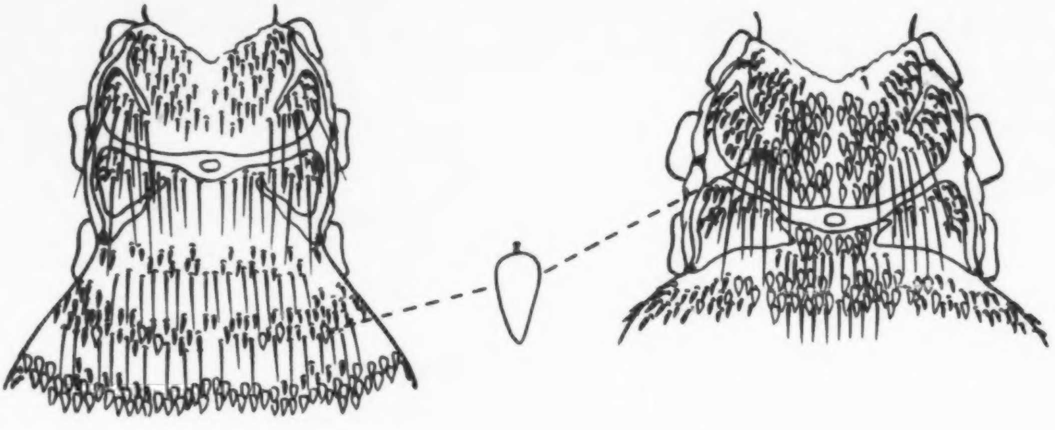


Fig. 1 A

Fig. 1 B

2. Thoracic sternum with a few long setae on posterior border (Fig. 2 A)..................
   ....*Antarctophthirus microchir* (Troussart & Neumann)

   Thoracic sternum without long setae on posterior border (Fig. 2 B).....................
   ....*Antarctophthirus trichechi* (Bohemann)

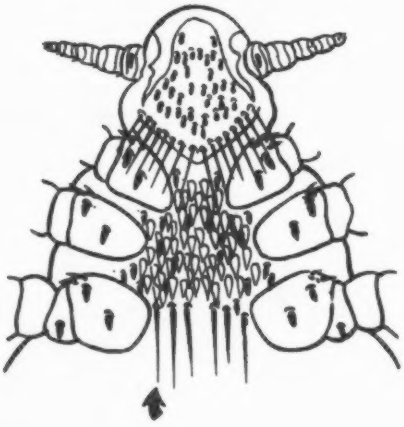


Fig. 2 A

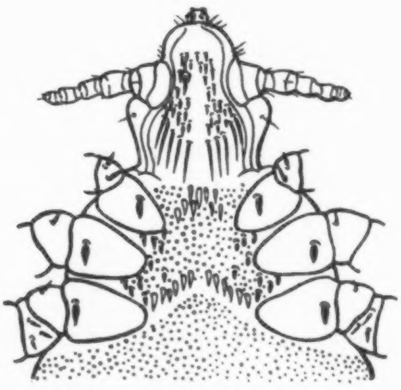


Fig. 2 B

Key to Genera of Haematopinidae

1. Sternal plate of thorax present; eyes absent but with prominent ocular points (Fig. 1 A) .... *Haematopinus*

Sternal plate of thorax absent; eyes present (Fig. 1 B). On peccary.................... .... *Pecaroecus javalii* Babcock & Ewing

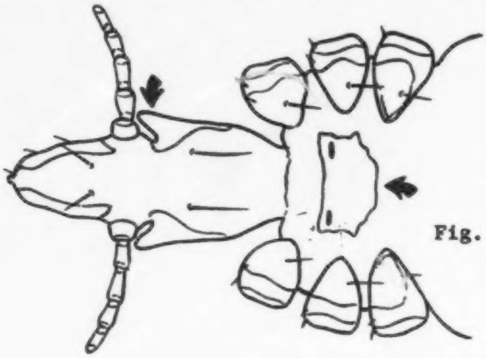


Fig. 1 A

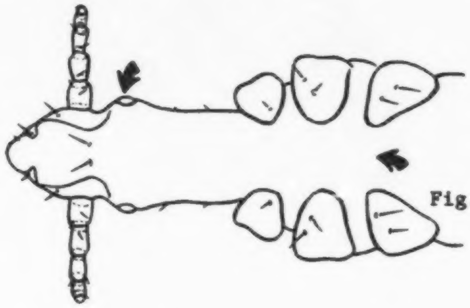


Fig. 1 B

Key to Species of Haematopinus

1. Thoracic sternal plate wider than long, sternal pits on plate (Fig. 1 A). Hog louse.... .... *Haematopinus suis* (Linnaeus)

Thoracic sternal plate longer than wide; sternal pits off plate (Fig. 1 B).............2

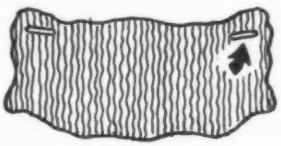


Fig. 2 A

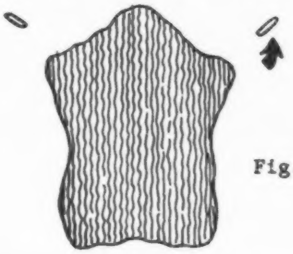


Fig. 2 B

2. Head at least two times as long as wide at ocular points; sternal plate without a median projection (Fig. 2 A & B). On equines. Horse sucking louse.................... .... *Haematopinus asini* (Linnaeus)

Head not two times as long as wide at ocular points; sternal plate with a median projection (Fig. 2 C & D). On cattle...3

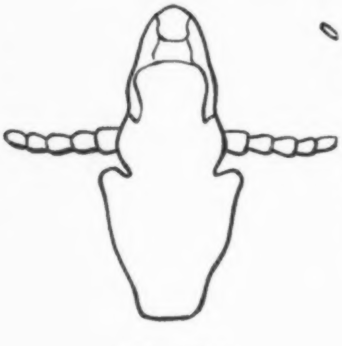


Fig. 2 A

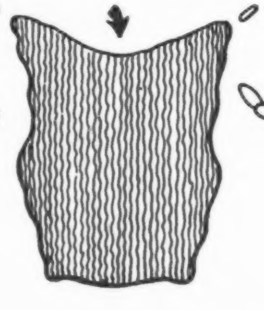


Fig. 2 B

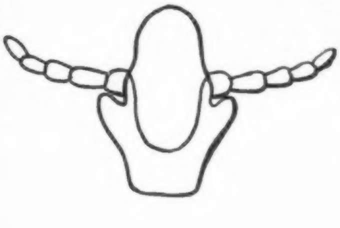


Fig. 2 C

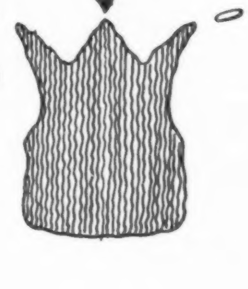


Fig. 2 D

3. Thoracic sternal plate with median projection blunt and rounded; male genital plate with six setae (Fig. 3 A & B). Short-nosed cattle louse...Haematopinus eurysternus (Nitzsch)

Thoracic sternal plate with median projection more acute and longer; male genital plate with four setae (Fig. 3 C & D). Cattle tail louse..Haematopinus quadripertusus Fahrenholz

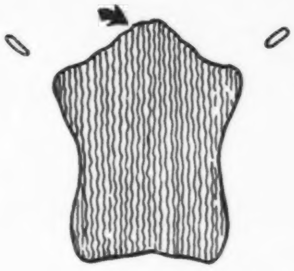


Fig. 3 A

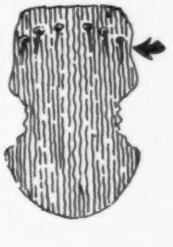


Fig. 3 B

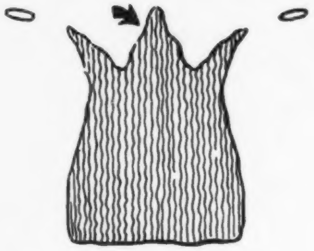


Fig. 3 C

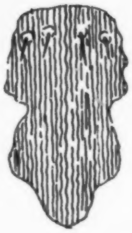


Fig. 3 D

Key to Genera of Hoplopleuridae

1. Paratergal plates very small being merely slightly sclerotized points (Fig. 1 A)...Haemodipsus

Paratergal plates on at least one abdominal segment usually as long as, or at least half as long as, the sternal plate (Fig. 1 B)......................................2

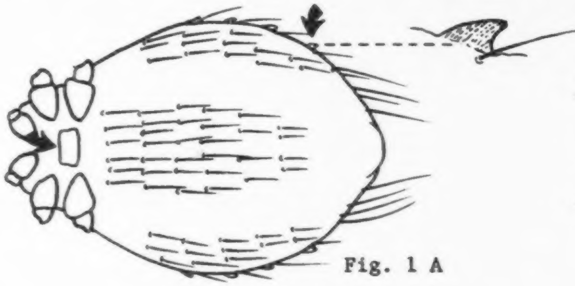


Fig. 1 A

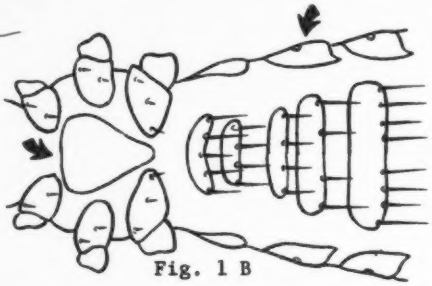


Fig. 1 B

2. First and second pair of legs of the same size and form, both being more slender and smaller than the third pair of legs (Fig. 2 A)......................................3

First pair of legs smallest of the three pairs; the second pair with stouter claws (Fig. 2 B)..4

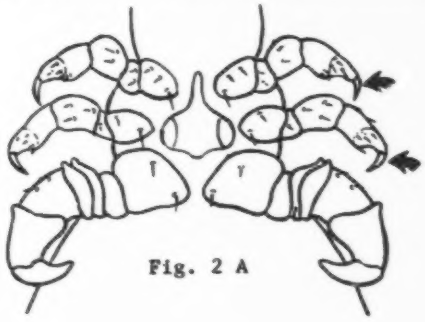


Fig. 2 A

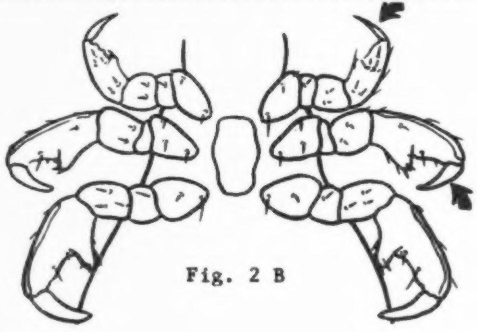


Fig. 2 B

3. A pair of small sclerotized plates present on venter of abdominal segment 2 (Fig. 3 A); antennae and head without hook-like processes............................*Enderleinellus*

Sclerotized plates entirely lacking on venter of abdominal segment 2; antennae and head with hook-like processes (Fig. 3 B)....................*Microphthirus uncinatus* (Ferris)

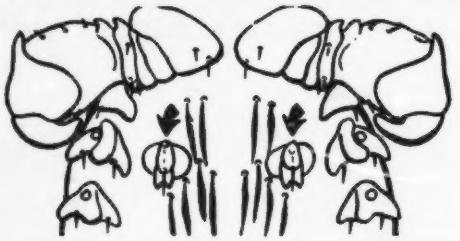


Fig. 3 A

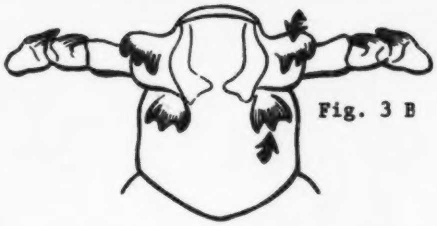


Fig. 3 B

4. Antennae four-segmented (sometimes appearing three-segmented); bladder-like expansions on third leg (Fig. 4 A & B)...........................*Haematopinoides squamosus* Osborn

Antennae five-segmented; bladder-like expansions lacking on third leg (Fig. 4 C)......5

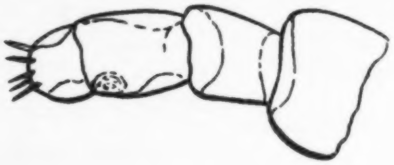


Fig. 4 A

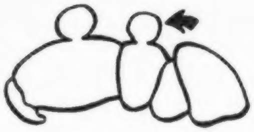


Fig. 4 B

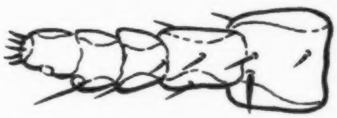


Fig. 4 C

5. First sternite of abdominal segment 3 extended laterally to articulate with its corresponding paratergal plate; this sternite bearing two groups of two or three stout setae (Fig. 5 A)..*Hoplopleura*

First sternite of abdominal segment 3 never articulating with paratergal plate (Fig. 5 B)..6

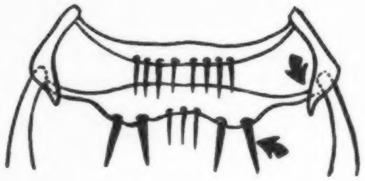


Fig. 5 A

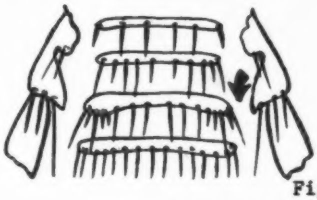


Fig. 5 B

6. Paratergal plate 2 completely divided longitudinally, one plate on the dorsum and the other on the venter of the abdomen (Fig. 6 A)............................*Fahrenholzia*

Paratergal plate 2 never completely divided to form two distinct plates (Fig. 6 B)....7

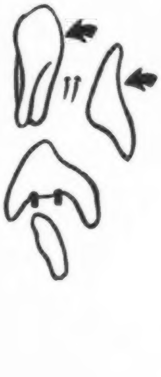


Fig. 6 A

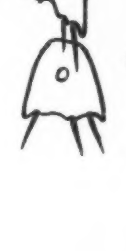


Fig. 6 B

7. Sternal plate of thorax usually pointed posteriorly or, if truncate, always associated with a huge enlargement of the first antennal segment (Fig. 7 A & B)..........Polyplax

Sternal plate of thorax usually emarginate posteriorly or sometimes quadrate in shape (Fig. 7 C & D)..Neohaematopinus

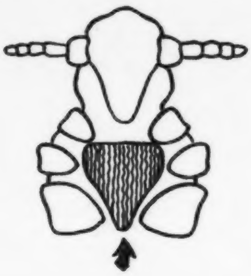


Fig. 7 A

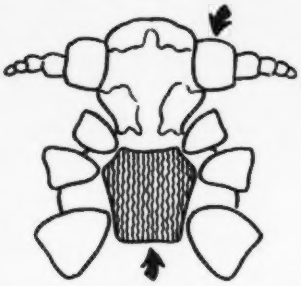


Fig. 7 B

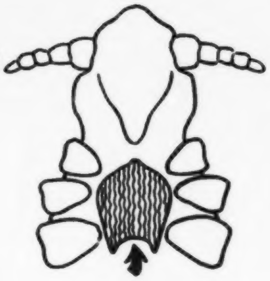


Fig. 7 C

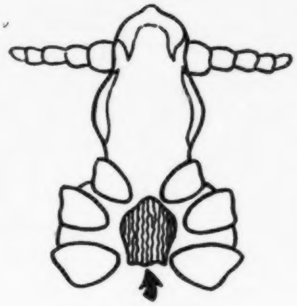


Fig. 7 D

Key to Species of Enderleinellus

1. Paratergal plates present on abdominal segments 2-5 (Fig. 1 A)........................2

Paratergal plates present on abdominal segments 2-6; abdominal sternites and tergites present in both sexes (Fig. 1 B). On Sciurus........Enderleinellus nitzschi Fahrenholz

Fig. 1 A

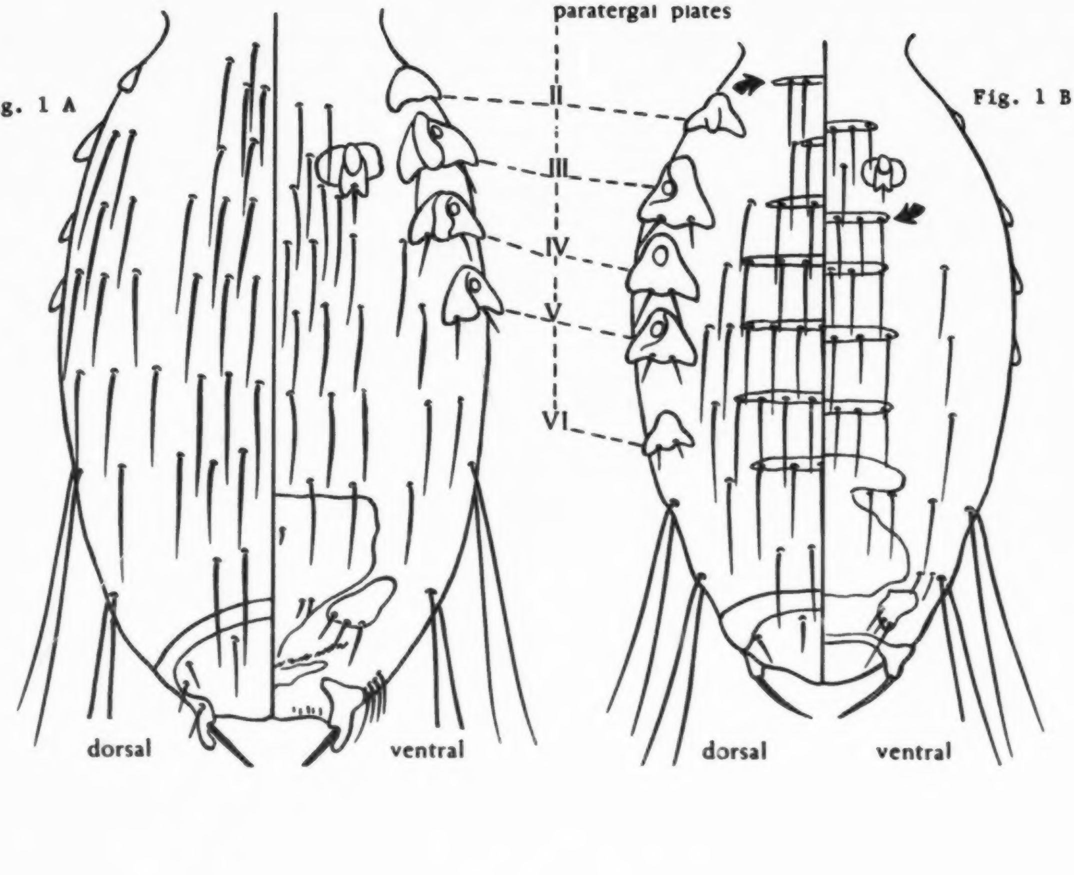


Fig. 1 B

2. **Paired ventral plates of abdominal segment 2 completely detached from its corresponding paratergal plate; each ventral plate bearing a single seta (Fig. 2 A). On Sciurus....3**

Paired ventral plates of abdominal segment 2 each extending laterally to unite with its corresponding paratergal plate; ventral plates without setae (Fig. 2 B)..............5

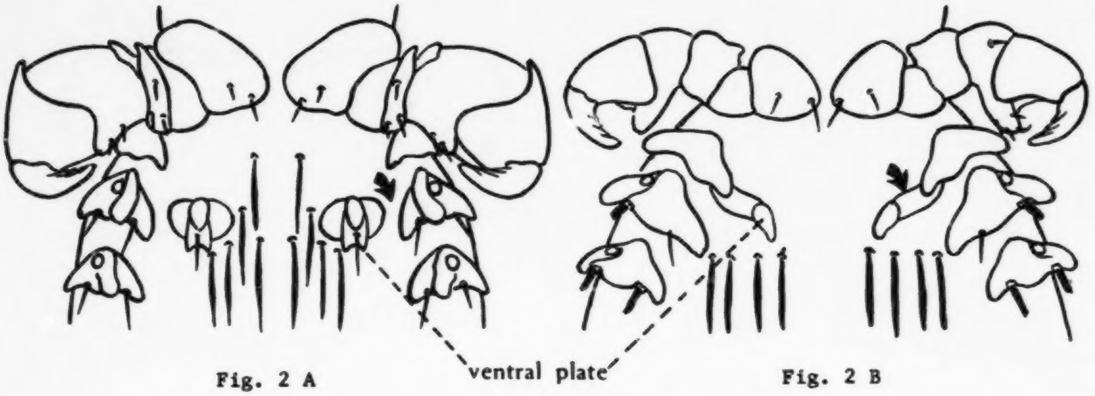


Fig. 2 A

Fig. 2 B

3. Spermatheca present; arms of basal plate apically bilobed (Fig. 3 A & B)..............4

Spermatheca absent; arms of basal plate not apically bilobed (Fig. 3 C)................
....Enderleinellus kelloggi Ferris

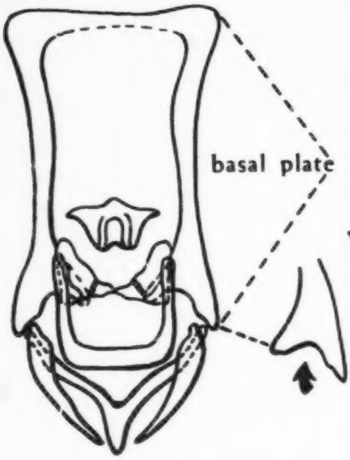


Fig. 3 A

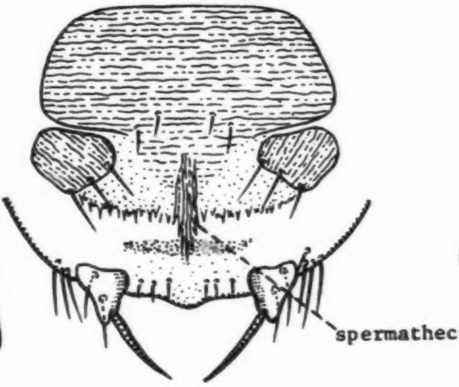


Fig. 3 B

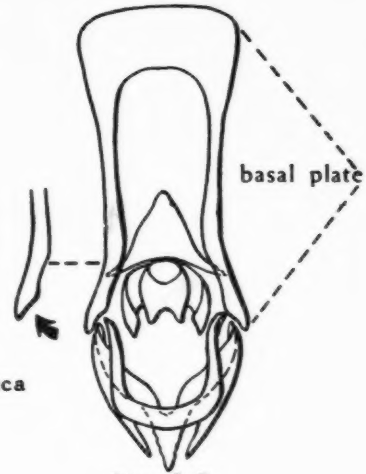


Fig. 3 C

4. Spermatheca a straight slightly tapering tube; arms of basal plate apically bilobed but not expanded (Fig. 4 A & B)................Enderleinellus longiceps (Kellogg & Ferris)

Spermatheca bent and with its ends expanded; arms of basal plate apically expanded and strongly bilobed (Fig. 4 C)........................Enderleinellus arizonensis Werneck

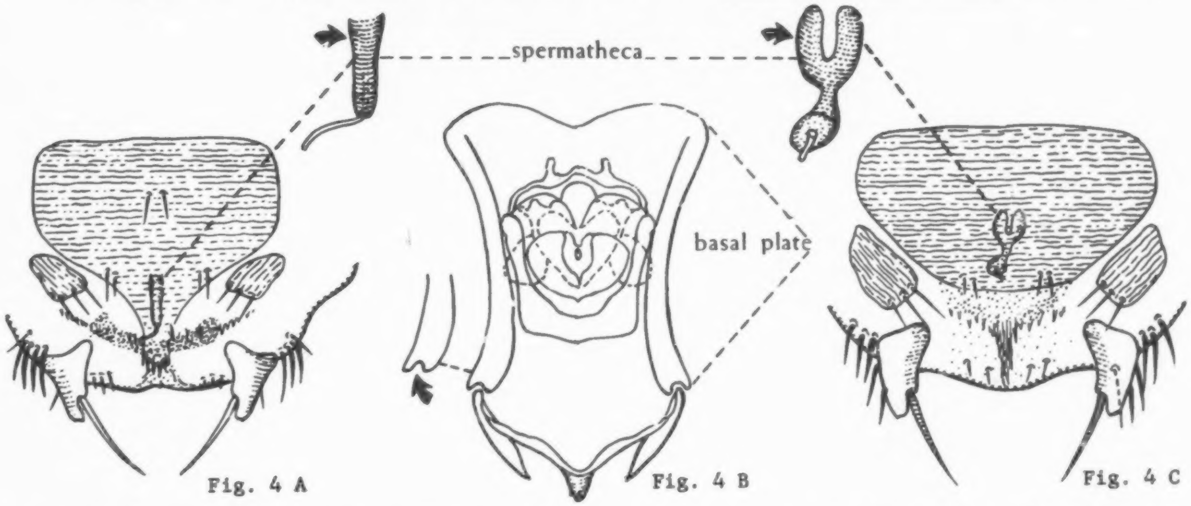


Fig. 4 A Fig. 4 B Fig. 4 C

5. Paratergal plate 5 and lateral margin of abdominal segment 6 without a pair of long setae (Fig. 5 A)..6

Paratergal plates or lateral margins of abdominal segments 4-8 with a pair of long setae (Fig. 5 B). On Marmota..........................Enderleinellus marmotae Ferris

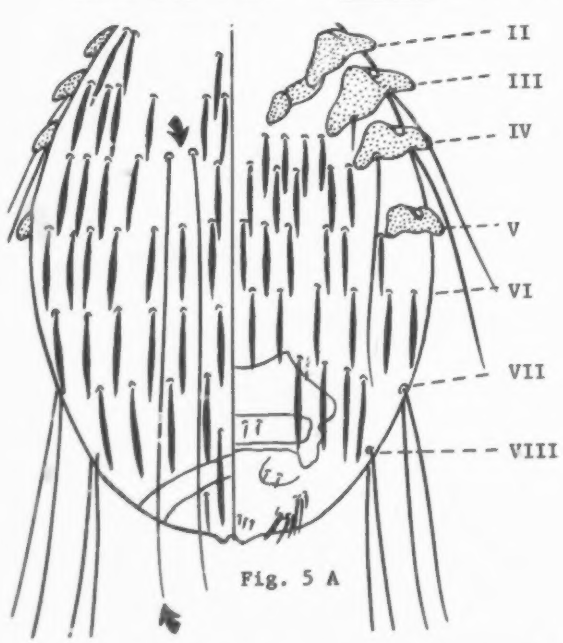


Fig. 5 A

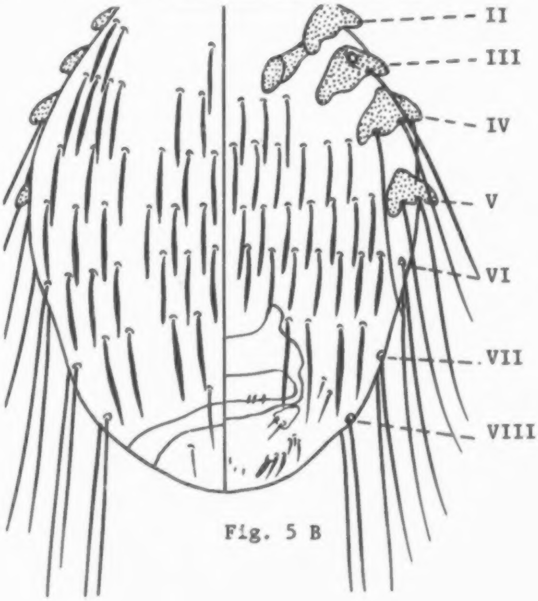


Fig. 5 B

6. Female with 2-4 long setae on dorsum of abdominal segment 4 reaching to apex of body (Fig. 5 A). On Citellus and Cynomys.........Enderleinellus osborni (Kellogg & Ferris)

Female without such setae. On Citellus..............Enderleinellus suturalis (Osborn)

Key to Species of Fahrenholzia

1. Paratergal plates present only on abdominal segments 2 to 4 (Fig. 1 A)................2

Paratergal plates present on at least abdominal segments 2-6 (Fig. 1 B)................6

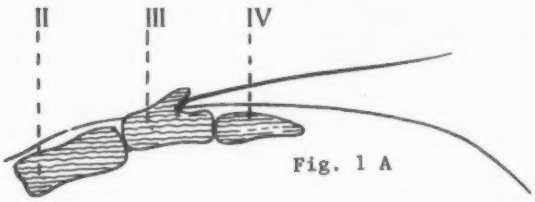


Fig. 1 A

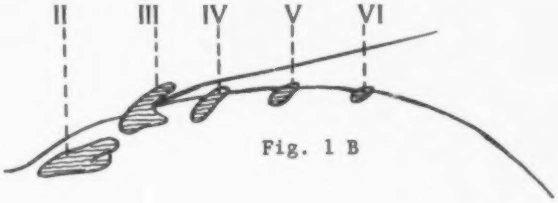


Fig. 1 B

2. Dorsal surface of abdomen with a narrow, sclerotized, median, longitudinal plate between paratergal plates 2 (Fig. 2 A). On *Liomys*..3

Dorsal surface of abdomen without such a plate (Fig. 2 B). On *Perognathus* and *Dipodomys* 5

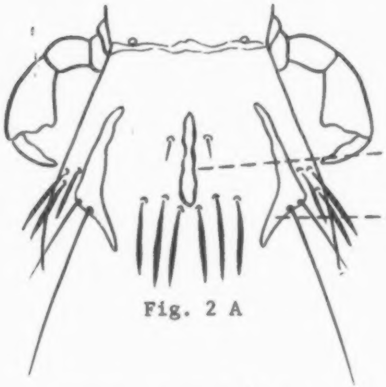


Fig. 2 A

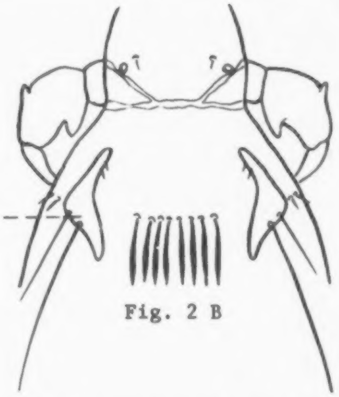


Fig. 2 B

3. Thoracic sternal plate concave on anterior margin; dorsal lobe of paratergal plate 3 pointed apically (Fig. 3 A & B).................*Fahrenholzia texana* Stojanovich & Pratt

Thoracic sternal plate convex on anterior margin; dorsal lobe of paratergal plate 3 apically truncate (Fig. 3 C & D)...4

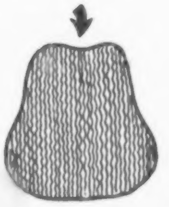


Fig. 3 A

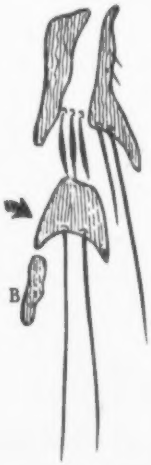


Fig. 3 B

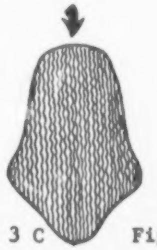


Fig. 3 C

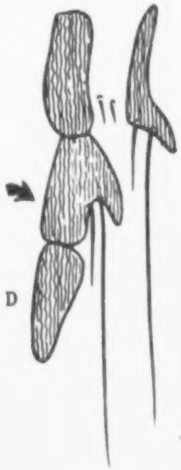


Fig. 3 D

4. Dorsal lobe of paratergal plate 2 with the smaller seta about as long as the plate (Fig. 4 A)..Fahrenholzia ehrlichi Johnson

Dorsal lobe of paratergal plate 2 with the smaller seta minute, much shorter than the plate (Fig. 4 B)..Fahrenholzia microcephala Ferris

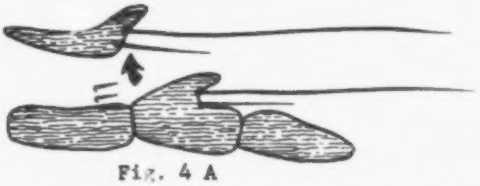


Fig. 4 A

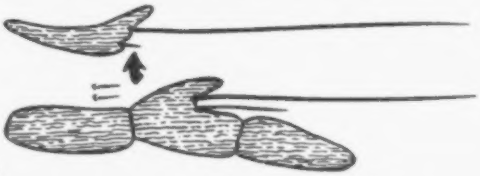


Fig. 4 B

5. Paratergal plates of abdominal segment 2 with a single pair of setae between dorsal and ventral lobes; male genitalia with parameres greatly expanded; female genital plate present (Fig. 5 A, B, & C)...........................Fahrenholzia pinnata Kellogg & Ferris

Paratergal plates of abdominal segment 2 with 6 to 8 long setae between dorsal and ventral lobes; parameres of male genitalia not expanded; female genital plate absent (Fig. 5 D & E)..Fahrenholzia reducta Ferris

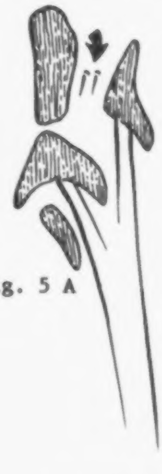


Fig. 5 A

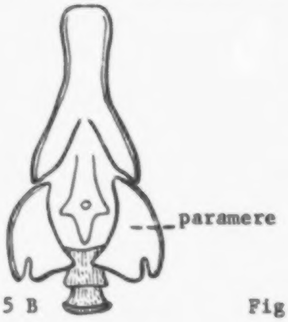


Fig. 5 B

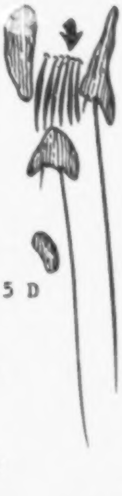


Fig. 5 D

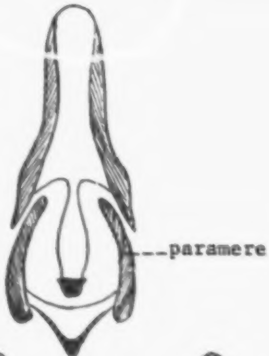


Fig. 5 E

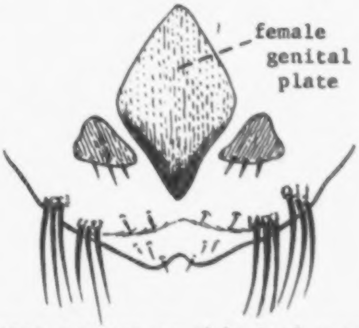


Fig. 5 C

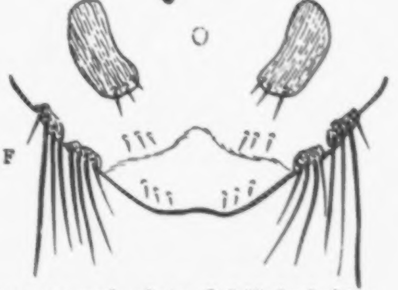


Fig. 5 F

6. Paratergal plates present on abdominal segments 2 to 6; paratergal plate 3 bilobed (Fig. 6 A)..Fahrenholzia zacatecae Ferris

Paratergal plates present on abdominal segments 2 to 7; paratergal plate 3 not bilobed (Fig. 6 B)..Fahrenholzia tribulosa Ferris

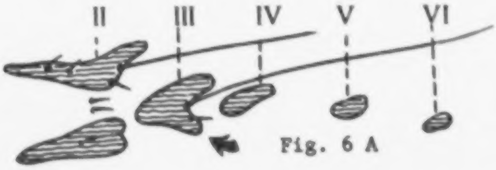


Fig. 6 A

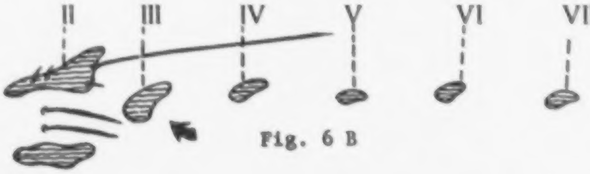


Fig. 6 B

Key to Species of Hoplopleura

1. Third abdominal sternal plate with two groups of two stout setae (Fig. 1 A)............2

Third abdominal sternal plate with two groups of three stout setae (Fig. 1 B)...........
On *Glaucomys*..................................*Hoplopleura trispinosa* Kellogg & Ferris

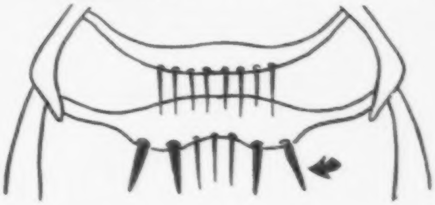


Fig. 1 A

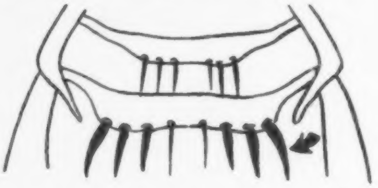


Fig. 1 B

2. Posterior margins of paratergal plates 3-5 with a broad or pointed lobe on each side (Fig. 2 A & B)..3

Posterior margins of paratergal plates 3-5 with four rounded lobes (Fig. 2 C)...........
On *Oryzomys*..................................*Hoplopleura oryzomydis* Pratt & Lane

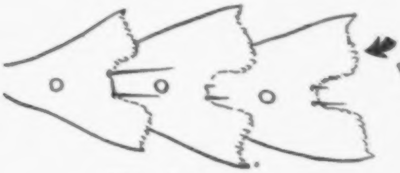


Fig. 2 A

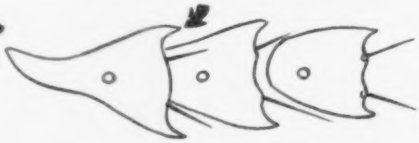


Fig. 2 B

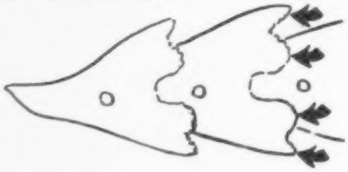


Fig. 2 C

3. Paratergal plates 4 and 5 with broad lobes on posterior margin (Fig. 3 A).............4

Paratergal plates 4 and 5 with pointed lobes on posterior margin (Fig. 3 B)...........7

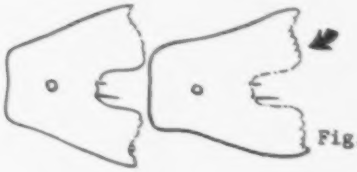


Fig. 3 A

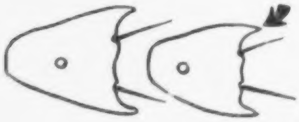


Fig. 3 B

4. Paratergal plates 4 and 5 with one large and one minute seta on posterior margin (Fig. 4 A)...5

Paratergal plates 4 and 5 with two large setae on posterior margin (Fig. 4 B)...........
On field rodents..................................*Hoplopleura acanthopus* (Burmeister)

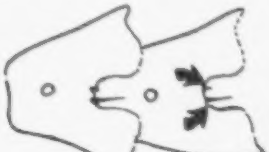


Fig. 4 A

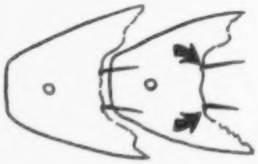


Fig. 4 B

5. Abdomen with setae in some of the membrane between sternal and paratergal plates (Fig. 5 A). On Rattus..Hoplopleura oenomydis Ferris

Abdomen without setae in membrane between ends of sternal and paratergal plates (Fig. 5 B)..6

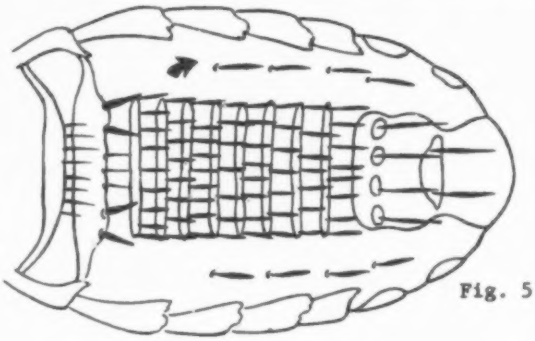


Fig. 5 A

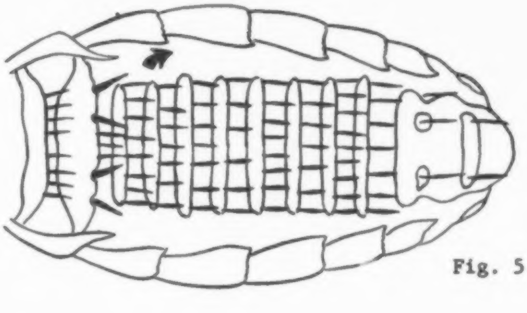


Fig. 5 B

6. Thoracic sternal plate pointed posteriorly (Fig. 6 A). On Peromyscus.................................*Hoplopleura hesperomydis (Osborn) and *Hoplopleura ferrisi Cook & Beer

Thoracic sternal plate blunt posteriorly (Fig. 6 B). On Onychomys..Hoplopleura onychomydis Cook & Beer

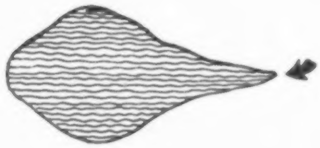


Fig. 6 A

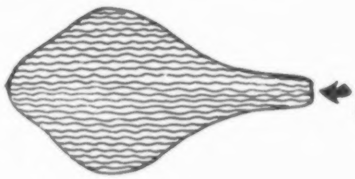


Fig. 6 B

7. Thoracic sternal plate about as long as broad; first sternal plate on abdominal segment 3 with two stout setae usually set close together on each side (Fig. 7 A).............8

Thoracic sternal plate definitely longer than broad; first sternal plate on abdominal segment 3 with two stout setae more widely spaced on each side (Fig. 7 B).............9

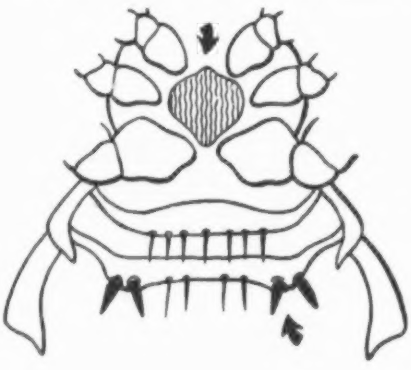


Fig. 7 A

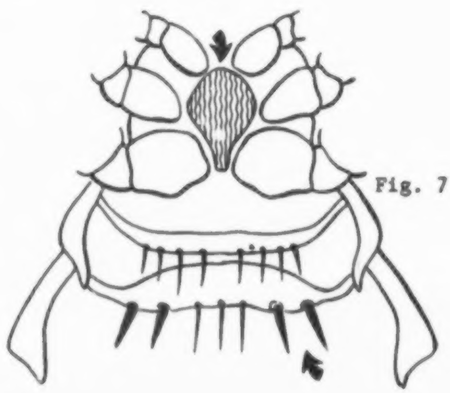


Fig. 7 B

*These species are separated only in the immature stages.

8. Paratergal plate 6 with posterior angles produced into points (Fig. 8 A). On Eutamias ....Hoplopleura arboricola Kellogg & Ferris

Paratergal plate 6 without points on posterior angles (Fig. 8 B). On Tamias...Hoplopleura erratica (Osborn)

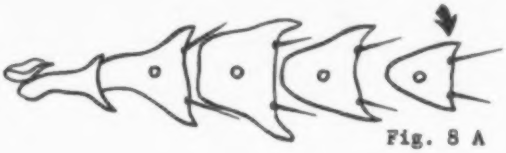


Fig. 8 A

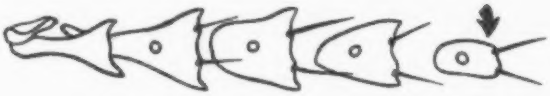


Fig. 8 B

9. Posterior margin of paratergal plate 6 with angles produced to form a deep emargination (Fig. 9 A). On Sciurus....................................Hoplopleura sciuricola Ferris

Posterior margin of paratergal plate 6 with angles not produced to form a deep emargination (Fig. 9 B). On Sigmodon...10

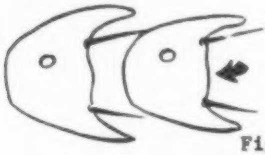


Fig. 9 A

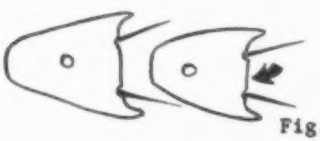


Fig. 9 B

10. Female with paratergal plates 4-6 elongated; male with 11 tergal plates bearing a row of setae (Fig. 10 A & B)........................Hoplopleura arizonensis Stojanovich & Pratt

Female with paratergal plates 4-6 only slightly elongated; male with only 7 tergal plates bearing a row of setae (Fig. 10 C & D).................Hoplopleura hirsuta Ferris

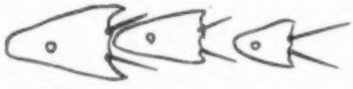


Fig. 10 A

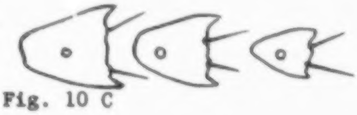


Fig. 10 C

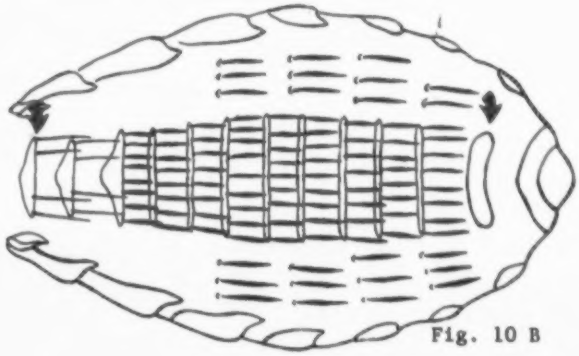


Fig. 10 B

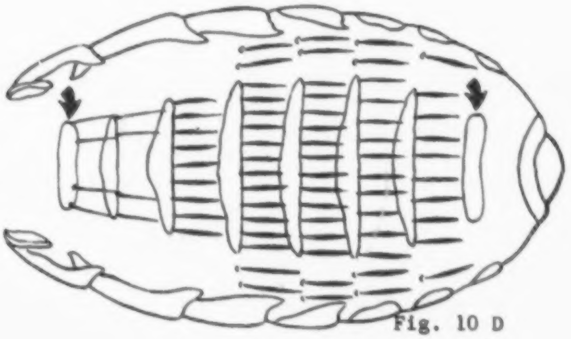


Fig. 10 D

Key to Species of Haemodipsus

1. Thoracic sternal plate almost three times as wide as long (Fig. 1 A). On domestic rabbits (Oryctolagus)...................................Haemodipsus ventricosus (Denny)

   Thoracic sternal plate hexogonal, being almost as long as wide (Fig. 1 B). On wild rabbits and hares (Sylvilagus and Lepus).......................Haemodipsus setoni Ewing

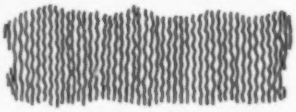


Fig. 1 A

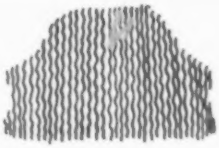


Fig. 1 B

Key to Species of Neohaematopinus

1. Thoracic sternal plate concave on posterior margin (Fig. 1 A)..........................2

   Thoracic sternal plate somewhat oval, and convex on posterior margin (Fig. 1 B).......11

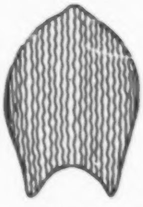


Fig. 1 A

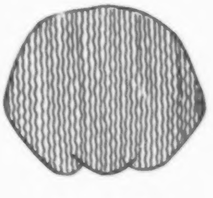


Fig. 1 B

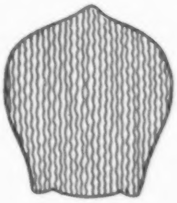


Fig. 1 C

2. Paratergal plates 3 to 6 with three spines on posterior margins (Fig. 2 A)............3

   Paratergal plates 3 to 6 with two spines on posterior margins (Fig. 2 B)..............5

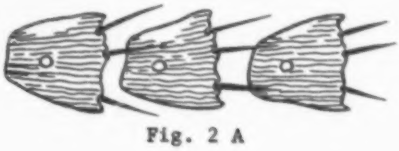


Fig. 2 A

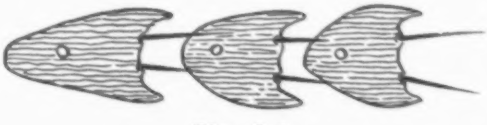


Fig. 2 B

3. Posterior angle of first antennal segment with a stout spine (Fig. 3 A). On Eutamias...Neohaematopinus pacificus (Kellogg & Ferris)

   Posterior angle of first antennal segment without a stout spine (Fig. 3 B)............4

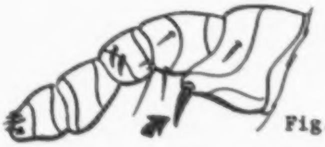


Fig. 3 A

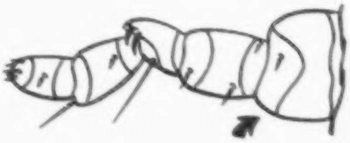


Fig. 3 B

4. Abdominal tergal and sternal plates present on each segment in both sexes (Fig. 4 A).... On Citellus tereticaudus..............................Neohaematopinus citellinus Ferris

Abdominal tergal and sternal plates absent in the middle segments of female; male with only sternal plates absent (Fig. 4 B). On Citellus spilosoma...Neohaematopinus spilosomae Stojanovich & Pratt

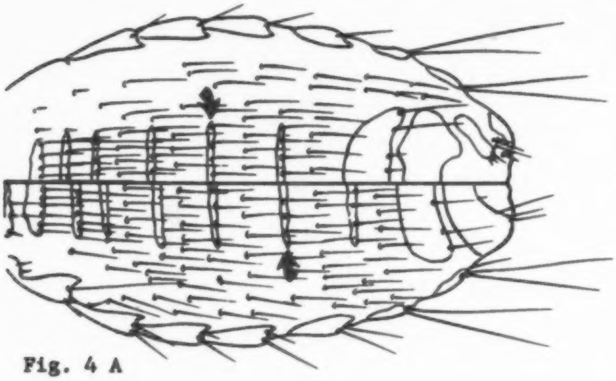


Fig. 4 A

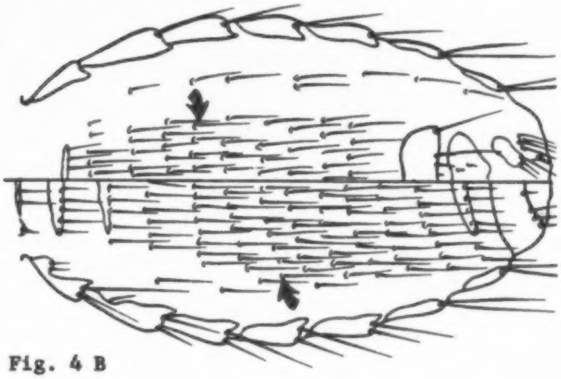


Fig. 4 B

5. First antennal segment prolonged posterio-apically, with stout spine (Fig. 5 A)........6

First antennal segment without such a prolongation (Fig. 5 B).........................8

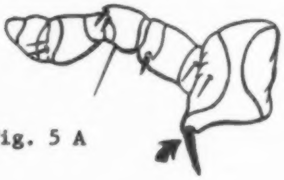


Fig. 5 A

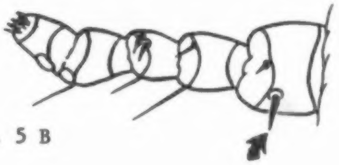


Fig. 5 B

6. Female without sternal and tergal plates on abdominal segments except for the normal terminal and genital segments (Fig. 6 A). On Sciurus griseicolus..Neohaematopinus griseicolus Ferris

Female with sternal and tergal plates on all abdominal segments (Fig. 6 B)............7

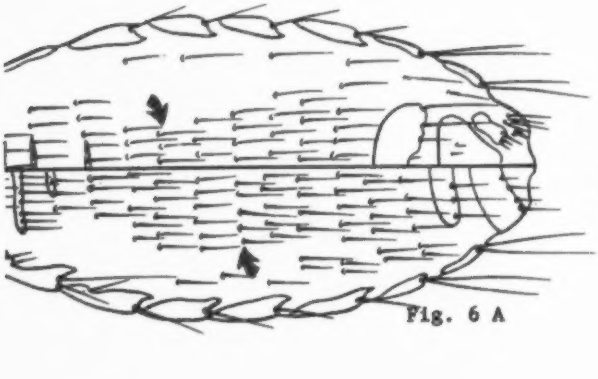


Fig. 6 A

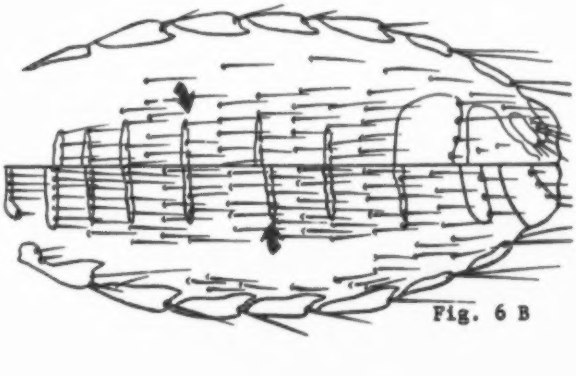


Fig. 6 B

7. Second antennal segment with short spine-like seta on posterior margin (Fig. 7 A)....... On *Tamias hudsonicus*................................*Neohaematopinus semifasciatus* Ferris

Second antennal segment without spine-like seta (Fig. 7 B). On *Sciurus niger*........... ....*Neohaematopinus sciurinus* Mjöberg

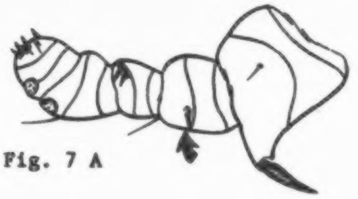


Fig. 7 A

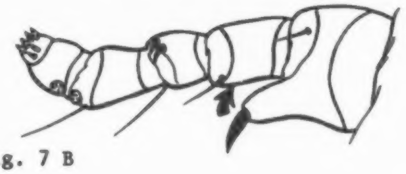


Fig. 7 B

8. Abdominal sternal and tergal plates absent in female; male with only sternal plates absent (Fig. 8 A). On *Neotoma cinerea*...................*Neohaematopinus inornatus* Ferris

Abdominal sternal and tergal plates present in both sexes (Fig. 9 A)...................9

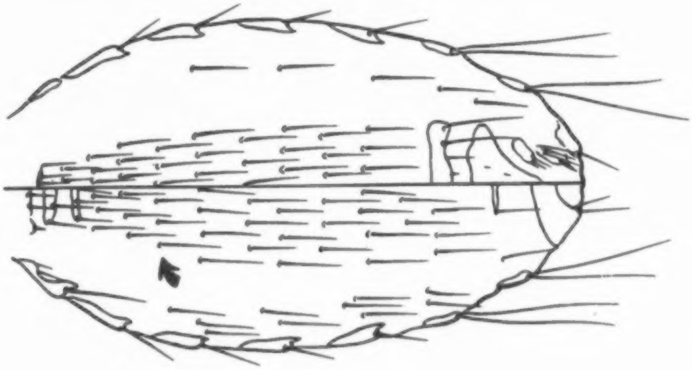


Fig. 8 A

9. A row of setae present on membrane between most of the sternal and tergal plates of abdomen (Fig. 9 A)...10

Membrane between the abdominal sternal and tergal plates without a row of setae (Fig. 9 B). On *Glaucomys*..............................*Neohaematopinus sciuropteri* (Osborn)

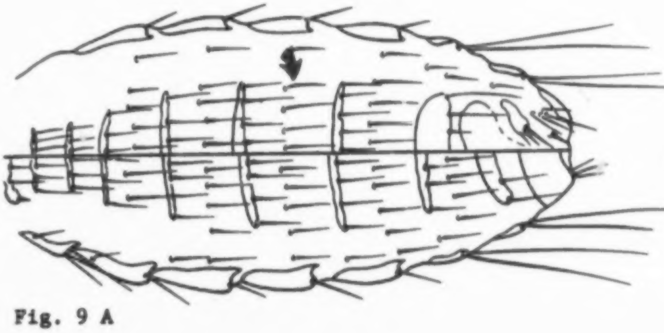


Fig. 9 A

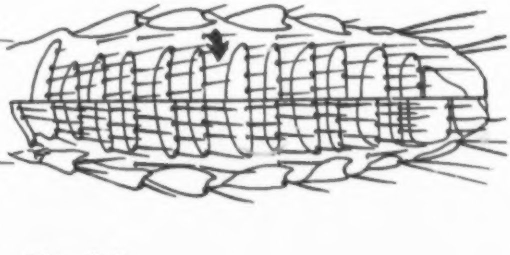


Fig. 9 B

10. First antennal segment with a spine-like seta at the posterio-apical angle (Fig. 10 A) On *Sciurus carolinensis*..................................*Neohaematopinus sciuri* Jancke

First antennal segment with a spine-like seta set somewhat away from the margin in the posterio-apical angle (Fig. 10 B). On *Neotoma albigula*, *streatori* and *micropus*....... ....*Neohaematopinus neotomae* Ferris

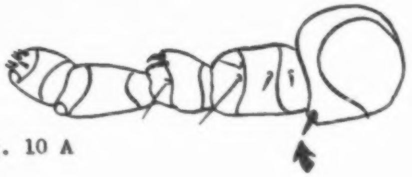


Fig. 10 A

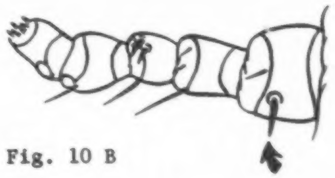


Fig. 10 B

11. Thoracic spiracle small, about one-fourth length of second coxa (Fig. 11 A)........... On *Citellus* and *Cynomys*..........................*Neohaematopinus laeviusculus* (Grube)

Thoracic spiracle larger, almost one-half length of second coxa (Fig. 11 B)........... On *Marmota*...*Neohaematopinus marmotae* Ferris

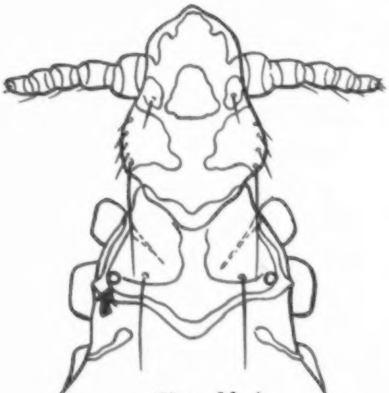


Fig. 11 A

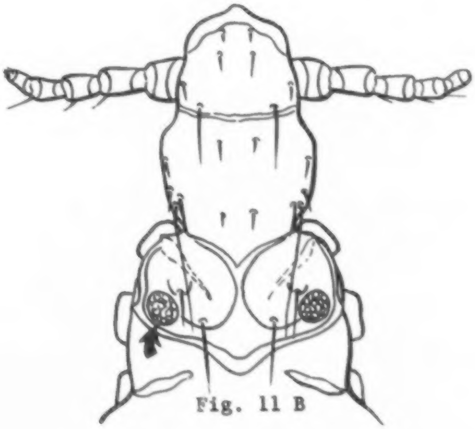


Fig. 11 B

Key to Species of Polyplax

1. Sternal plate of thorax rounded or pointed posteriorly (Fig. 1 A).......................2

   Sternal plate of thorax truncate posteriorly (Fig. 1 B). On *Peromyscus* and *Onychomys*... ....*Polyplax auricularis* Ferris

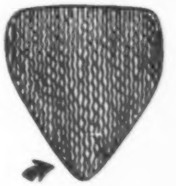


Fig. 1 A

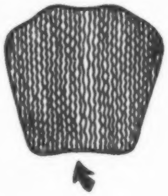


Fig. 1 B

2. Paratergal plate 4 with both setae short or subequal (Fig. 2 A)........................3

   Paratergal plate 4 with dorsal seta longer than ventral seta; usually as long or longer than plate (Fig. 2 B). On house mouse.....................*Polyplax serrata* (Burmeister)

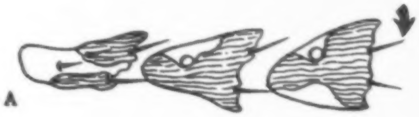


Fig. 2 A

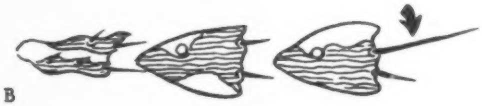


Fig. 2 B

3. Paratergal plates 3-5 with both apical angles produced into points (Fig. 3 A)........... On microtene mice..4

   Paratergal plates 3-5 with only dorsal apical angle produced into a point (Fig. 3 B).... On *Rattus*......................................*Polyplax spinulosa* (Burmeister)

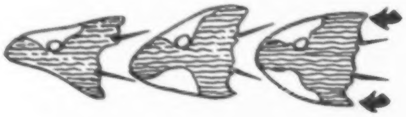


Fig. 3 A

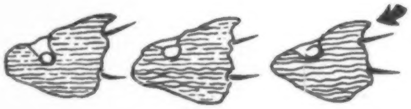


Fig. 3 B

4. First abdominal sternal plate strongly arcuate and with its lateral angles somewhat prolonged (Fig. 4 A)...*Polyplax borealis* Ferris

   First abdominal sternal plate not arcuate, its posterior margin almost straight and lateral angles not produced (Fig. 4 B)........................*Polyplax alaskensis* Ewing

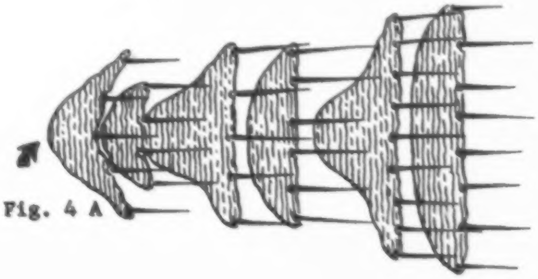


Fig. 4 A

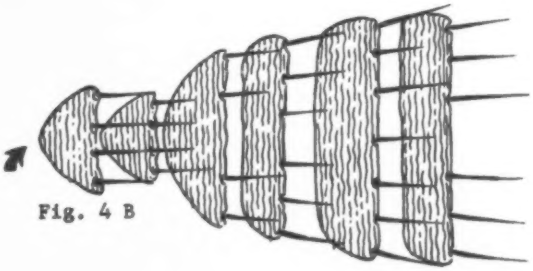


Fig. 4 B

Key to Genera of Linognathidae

1. Sternal plate of thorax at least half as wide as long (Fig. 1 A)...........*Solenopotes*

Sternal plate of thorax small and slender or completely lacking (Fig. 1 B)..*Linognathus*

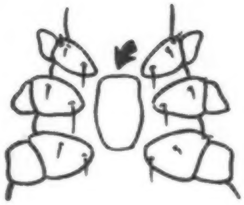


Fig. 1 A

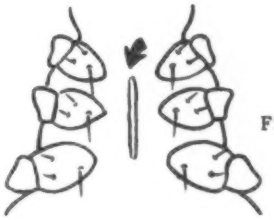


Fig. 1 B

Key to Species of Linognathus

1. Head about as broad as long; antennae almost as long as head (Fig. 1 A)...............2

Head almost twice as long as wide or longer; antennae noticeably shorter than head (Fig. 1 B)...3

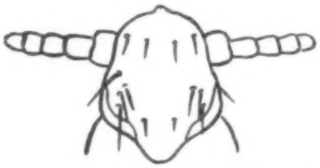


Fig. 1 A

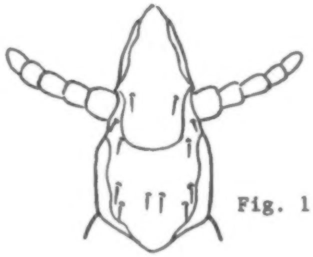


Fig. 1 B

2. Thoracic dorsum with four long setae; head slightly longer than broad (Fig. 2 A). On dogs, foxes and ferrets. Dog sucking louse...........*Linognathus setosus* (von Olfers)

Thoracic dorsum with two long setae; head definitely as broad as long (Fig. 2 B)....... Sheep foot louse..*Linognathus pedalis* (Osborn)

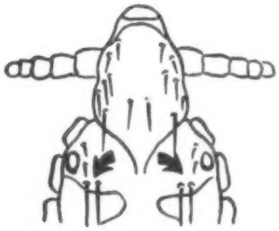


Fig. 2 A

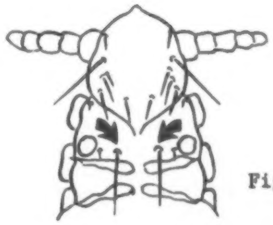


Fig. 2 B

3. Fore head acutely conical and much elongated; female gonopod with a sclerotized hook (Fig. 3 A & B). On cattle. Long-nosed cattle louse......*Linognathus vituli* (Linnaeus)

Fore head rounded (Fig. 3 C); female gonopod rounded or with a slight tooth (Fig. 5 B & C). On sheep and goats..4

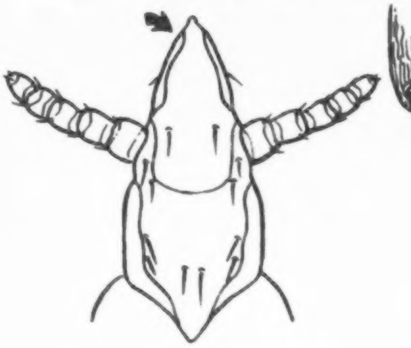


Fig. 3 A

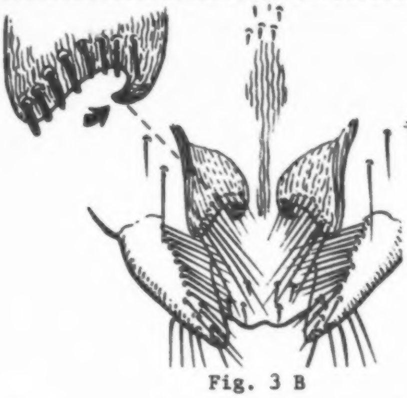


Fig. 3 B

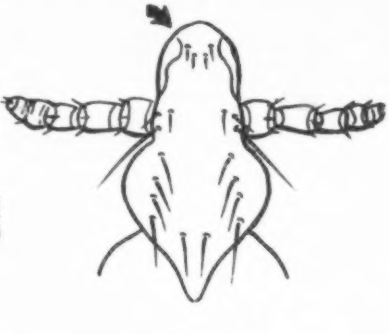


Fig. 3 C

4. Head greatly expanded behind antennae; female gonopod rounded (Fig. 4 A & B). Goat sucking louse.................................*Linognathus africanus* (Kellogg & Paine)

Head not greatly expanded behind antennae (Fig. 4 C)...................................5

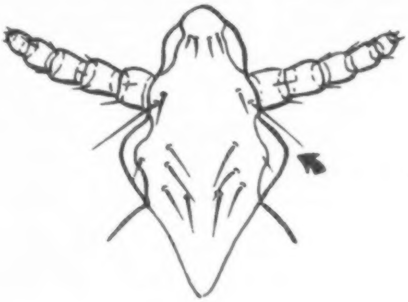


Fig. 4 A

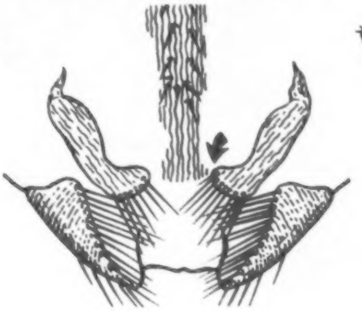


Fig. 4 B

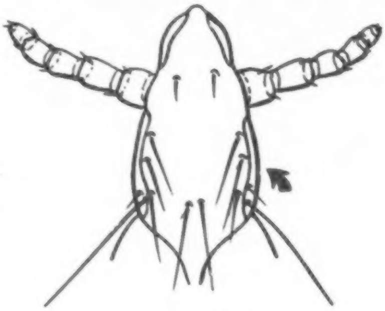


Fig. 4 C

5. Thoracic spiracle large and conspicuous; female gonopod rounded (Fig. 5 A & B). Sheep louse..*Linognathus ovillus* (Neumann)

Thoracic spiracle not large and conspicuous; female gonopod with a slight tooth (Fig. 5 C & D). Goat sucking louse.........................*Linognathus stenopsis* (Burmeister)

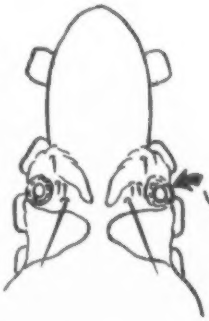


Fig. 5 A

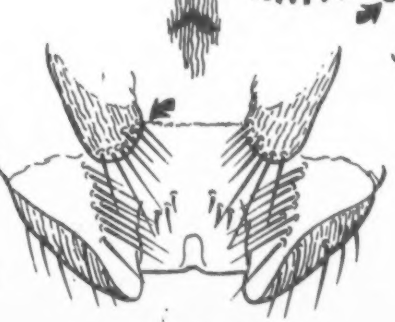


Fig. 5 B

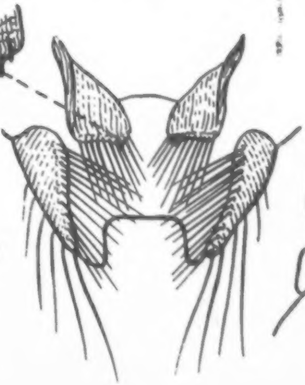


Fig. 5 C

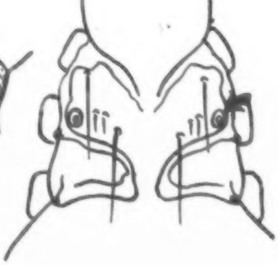


Fig. 5 D

Key to Species of Solenopotes

1. Abdominal spiracles strongly protuberant (Fig. 1 A); female genitalia with apical processes strongly constricted near middle (Fig. 1 B); male genitalia as in figure 2 E. On cattle. Little blue cattle louse........................Solenopotes capillatus Enderlein

   Abdominal spiracles only slightly protuberant (Fig. 1 C); female genitalia with apical processes not constricted (Fig. 1 D & E); male genitalia as in figures 2 C & D. On deer..2

Fig. 1 A

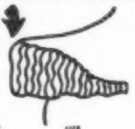
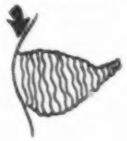


Fig. 1 C



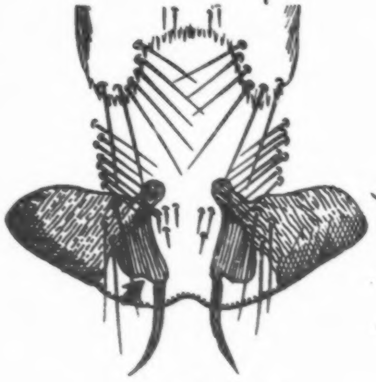


Fig. 1 B (capillatus)

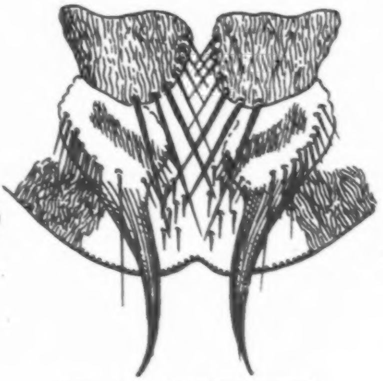


Fig. 1 D (binipilosus)

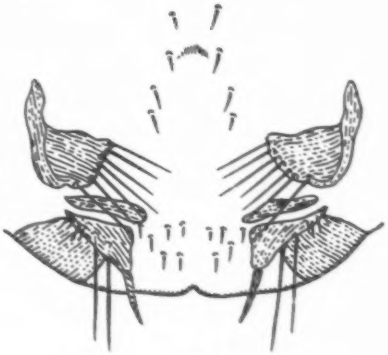


Fig. 1 E (ferrisi)

2. Neck present, head with distinct posterior-lateral angles (Fig. 2 A); female genitalia as in figure 1 E; male genitalia as in figure 2 C.......Solenopotes ferrisi (Fahrenholz)

   Head without distinct posterior-lateral angles (Fig. 2 B); female genitalia as in figure 1 D ; male genitalia as in figure 2 D..............Solenopotes binipilosus (Fahrenholz)

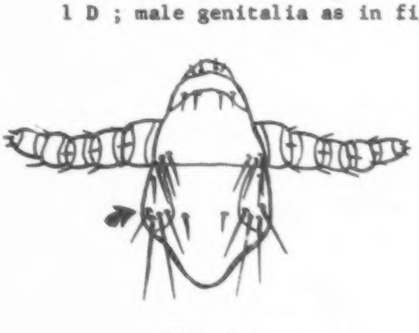


Fig. 2 A

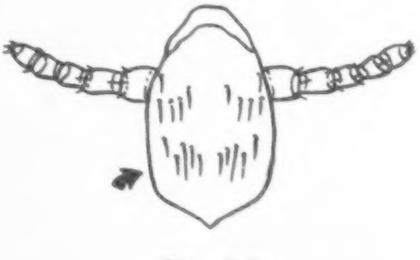


Fig. 2 B

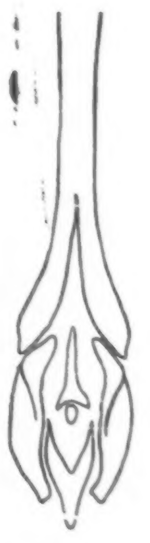


Fig. 2 C (ferrisi)

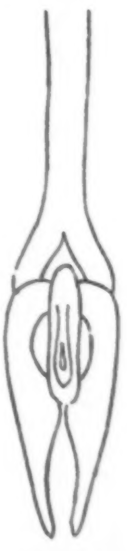


Fig. 2 D (binipilosus)

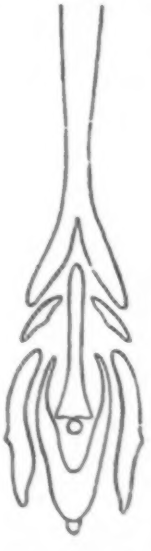


Fig. 2 E (capillatus)

Key to Genera of Pediculidae

1. Abdomen much longer than basal width; without hairy tubercles (Fig. 1 A). Head and body louse..Pediculus humanus Linnaeus

Abdomen about as long as basal width; with hairy tubercles (Fig. 1 B). Crab louse.... ....Pthirus pubis (Linnaeus)

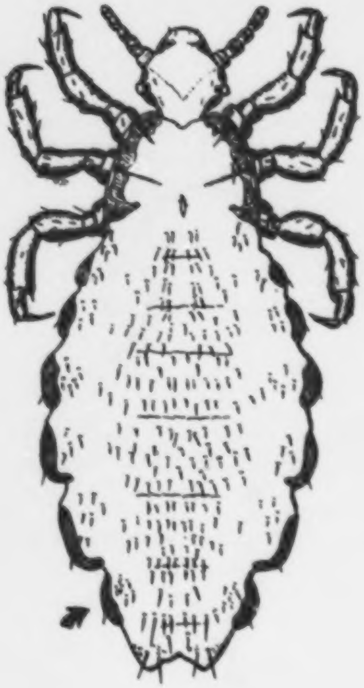


Fig. 1 A

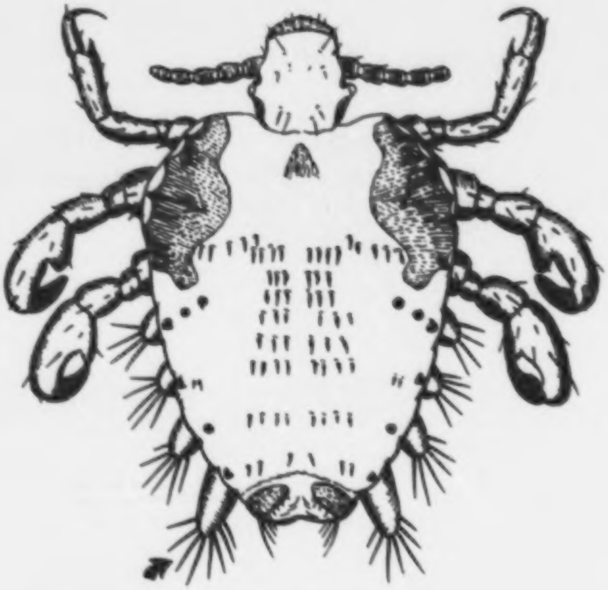
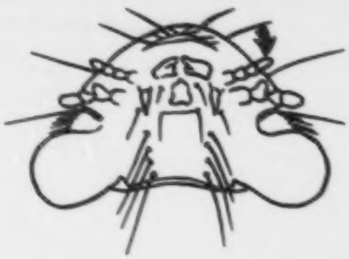


Fig. 1 B

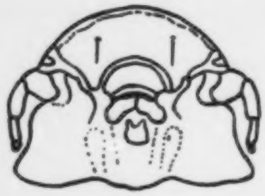
MALLOPHAGA: PICTORIAL KEY TO SPECIES INFESTING PIGEONS

Harold George Scott and Chester J. Stojanovich

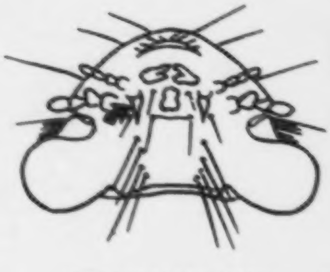
maxillary palps present



maxillary palps absent



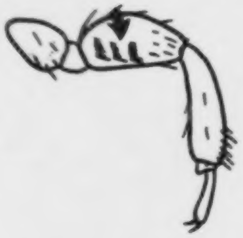
forehead with spines



Hohorstiella lata
LARGE PIGEON BODY LOUSE

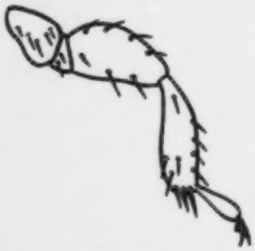
forehead without spines

femur III with comb



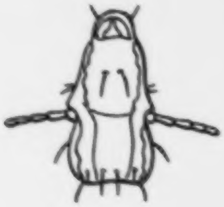
Colpocephalum turbinatum
SMALL PIGEON BODY LOUSE

femur III without comb



Bonomiella columbae
PIGEON VENT LOUSE

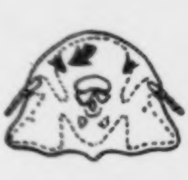
head longer than wide



Columbicola columbae
SLENDER PIGEON LOUSE

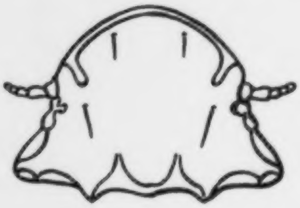
head wider than long

forehead with spines

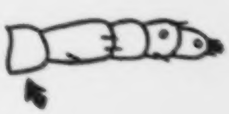


Physconelloides zenaidurae
PIGEON HEAD LOUSE

forehead without spines

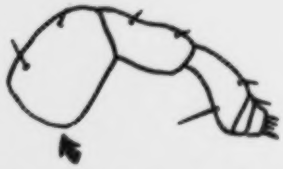


male basal antennal segment small



Campanulotes bidentatus compar
SMALL PIGEON FEATHER LOUSE

male basal antennal segment large

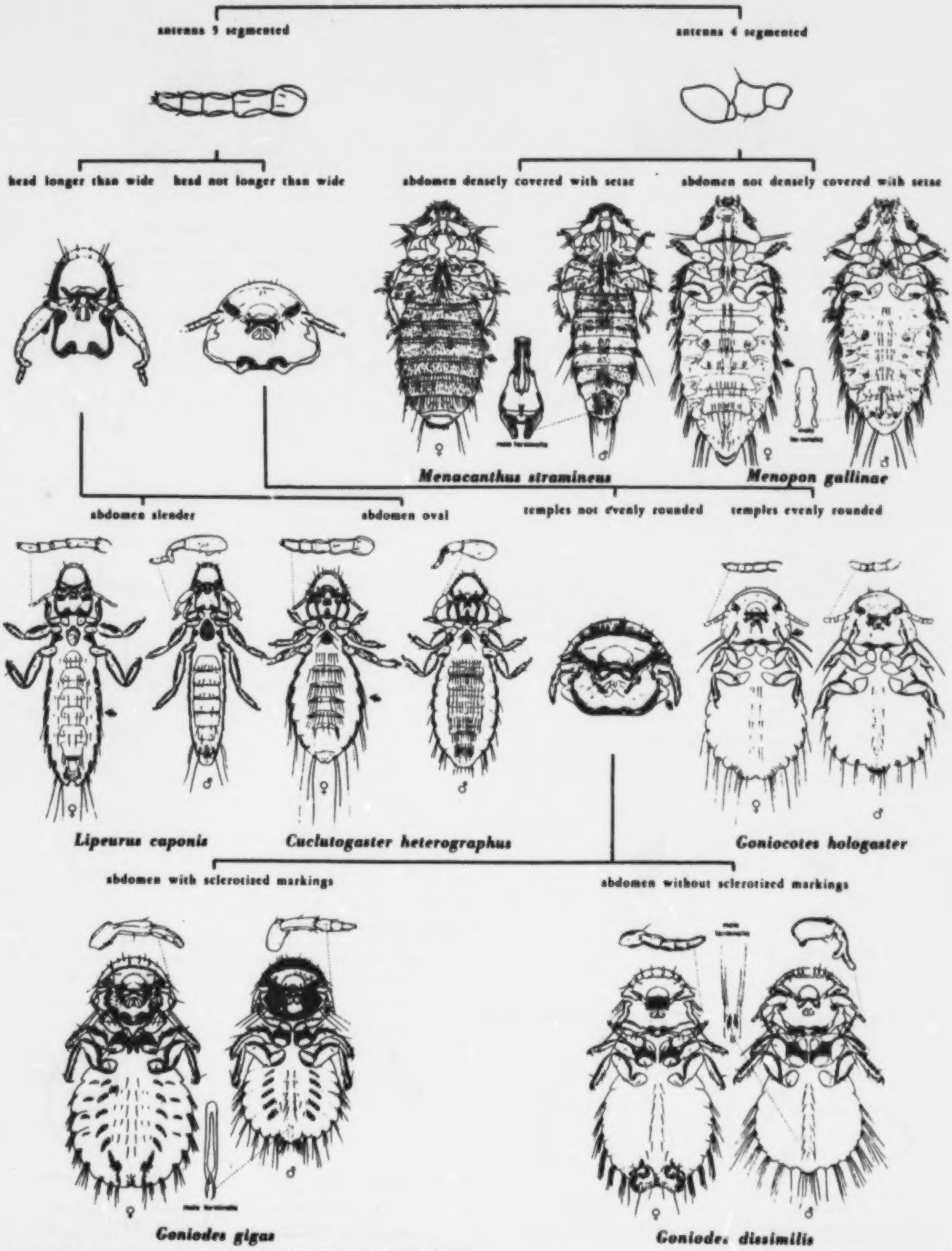


Coloceras damicorne fahrenholzi
LARGE PIGEON FEATHER LOUSE

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE. Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

MALLOPHAGA: PICTORIAL KEY TO SOME COMMON SPECIES ON CHICKENS

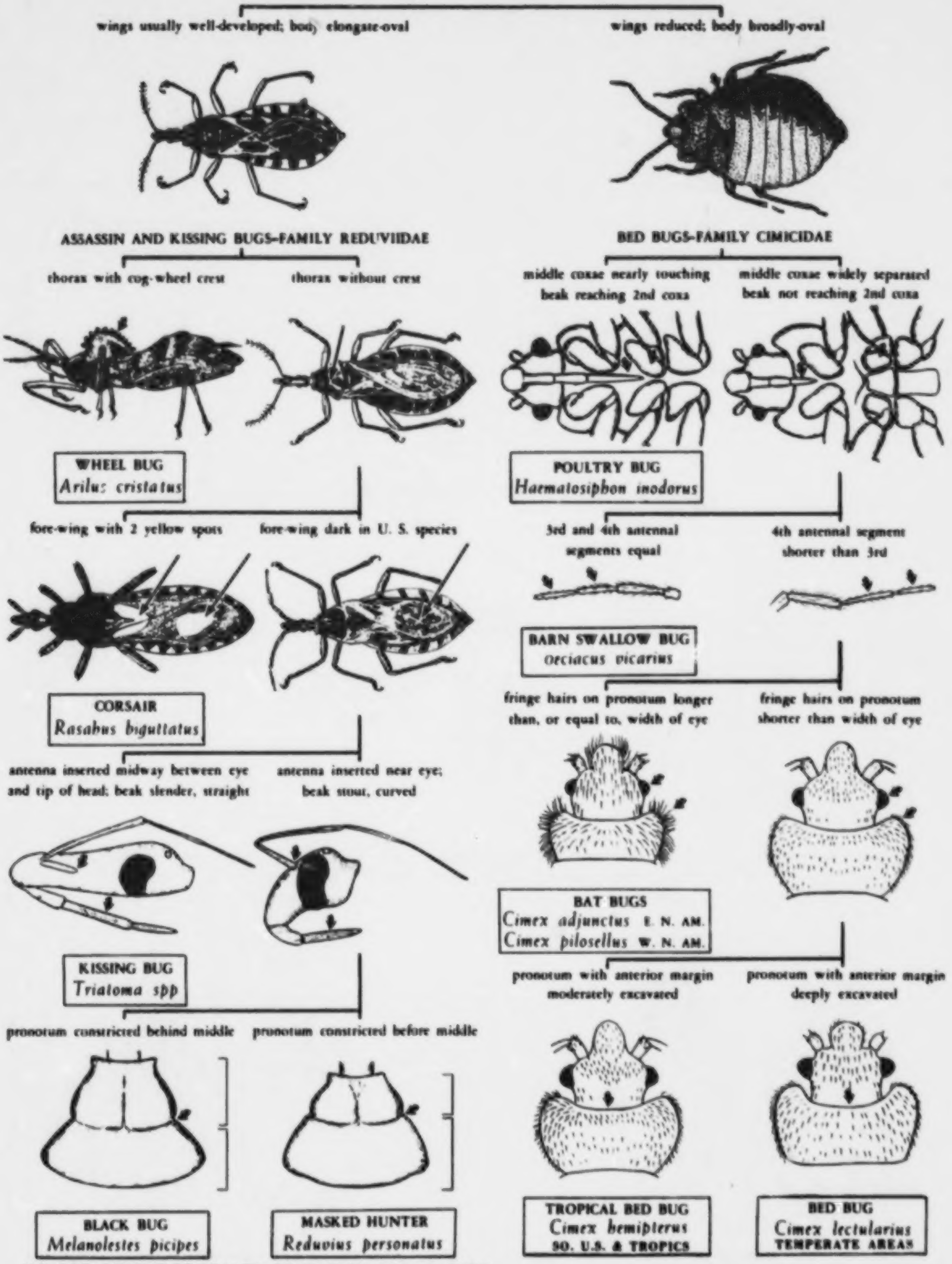
Chester J. Stojanovich and Harry D. Pratt


antenna 5 segmented
antenna 4 segmented
head longer than wide
head not longer than wide
abdomen densely covered with setae
abdomen not densely covered with setae
♀
♂
Menacanthus stramineus
Menopon gallinae
abdomen slender
abdomen oval
temples not evenly rounded
temples evenly rounded
Lipeurus caponis
Cuclutogaster heterographus
Goniocotes hologaster
abdomen with sclerotized markings
abdomen without sclerotized markings
Goniodes gigas
Goniodes dissimilis

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

BUGS: PICTORIAL KEY TO SOME SPECIES THAT MAY BITE MAN

Harry D. Pratt and Chester J. Stojanovich



wings usually well-developed; body elongate-oval

ASSASSIN AND KISSING BUGS–FAMILY REDUVIIDAE

thorax with cog-wheel crest

WHEEL BUG *Arilus cristatus*

thorax without crest

fore-wing with 2 yellow spots

CORSAIR *Rasahus biguttatus*

fore-wing dark in U. S. species

antenna inserted midway between eye and tip of head; beak slender, straight

KISSING BUG *Triatoma spp*

antenna inserted near eye; beak stout, curved

pronotum constricted behind middle

BLACK BUG *Melanolestes picipes*

pronotum constricted before middle

MASKED HUNTER *Reduvius personatus*

wings reduced; body broadly-oval

BED BUGS–FAMILY CIMICIDAE

middle coxae nearly touching
beak reaching 2nd coxa

POULTRY BUG *Haematosiphon inodorus*

middle coxae widely separated
beak not reaching 2nd coxa

3rd and 4th antennal segments equal

BARN SWALLOW BUG *Oeciacus vicarius*

4th antennal segment shorter than 3rd

fringe hairs on pronotum longer than, or equal to, width of eye

BAT BUGS
Cimex adjunctus E. N. AM.
Cimex pilosellus W. N. AM.

fringe hairs on pronotum shorter than width of eye

pronotum with anterior margin moderately excavated

TROPICAL BED BUG
Cimex hemipterus
SO. U.S. & TROPICS

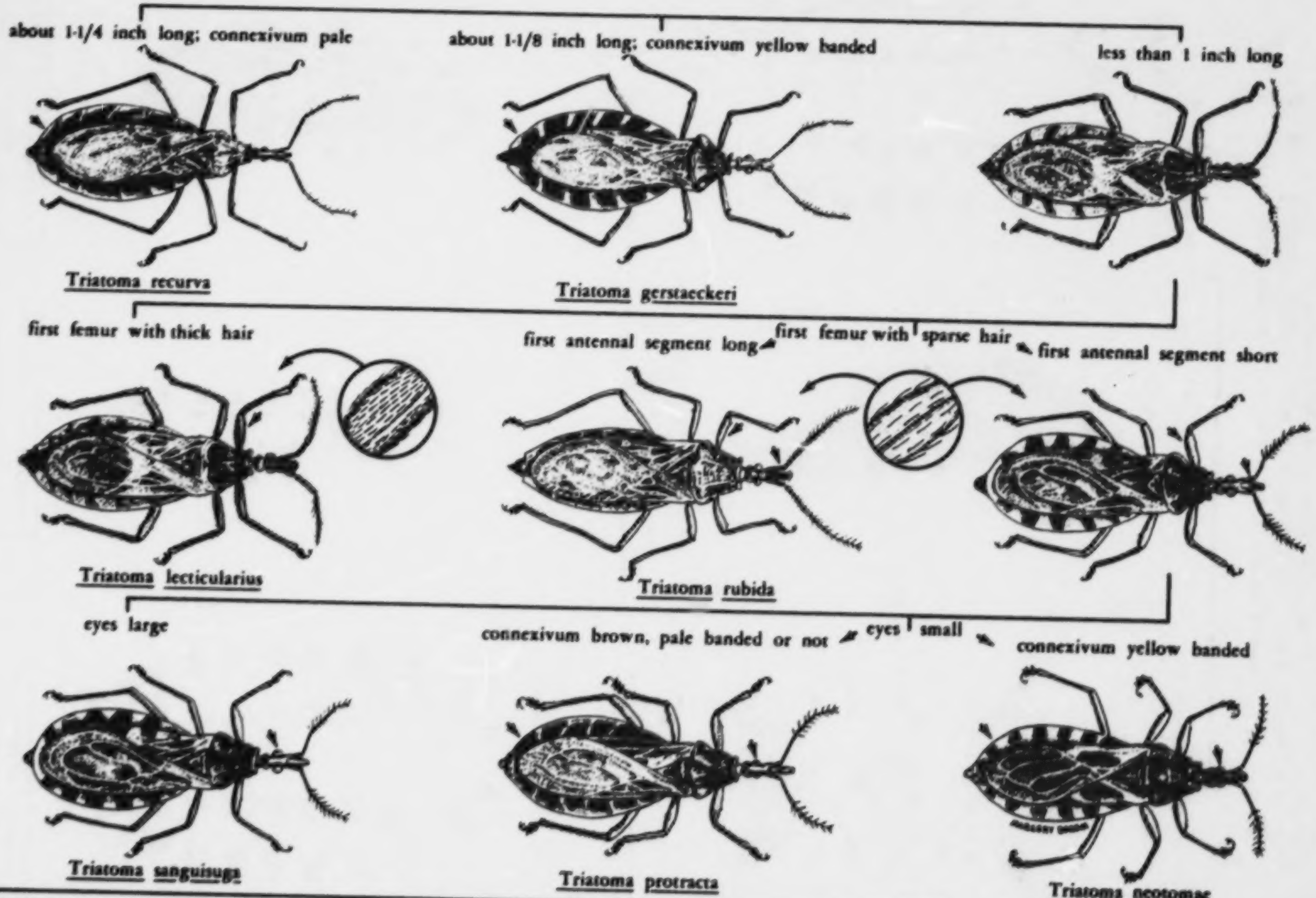
pronotum with anterior margin deeply excavated

BED BUG
Cimex lectularius
TEMPERATE AREAS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

KISSING BUGS: PICTORIAL KEY TO SOME COMMON SPECIES IN THE UNITED STATES

Harold George Scott and Margery R. Borom

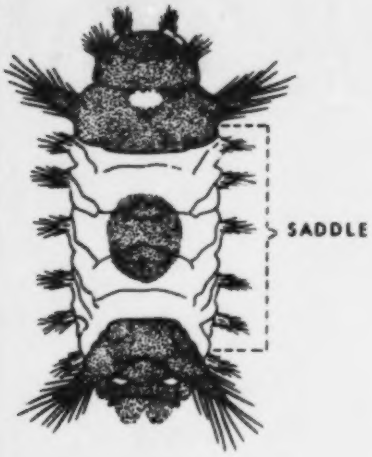

about 1-1/4 inch long; connexivum pale
about 1-1/8 inch long; connexivum yellow banded
less than 1 inch long
Triatoma recurva
Triatoma gerstaeckeri
first femur with thick hair
first femur with sparse hair
first antennal segment long
first antennal segment short
Triatoma lecticularius
Triatoma rubida
eyes large
eyes small
connexivum brown, pale banded or not
connexivum yellow banded
Triatoma sanguisuga
Triatoma protracta
Triatoma neotomae

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1961

STINGING CATERPILLARS:
PICTORIAL KEY TO SOME IMPORTANT UNITED STATES SPECIES

Harold George Scott & Chester J. Stojanovich

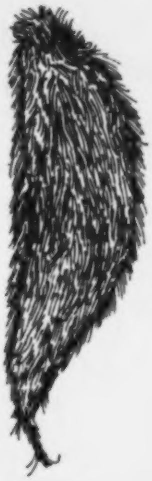
WITH DORSAL SADDLE



SADDLEBACK CATERPILLAR
Sibine stimulae

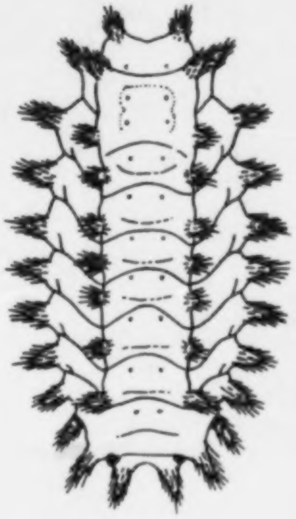
WITHOUT DORSAL SADDLE

BODY FUR-LIKE



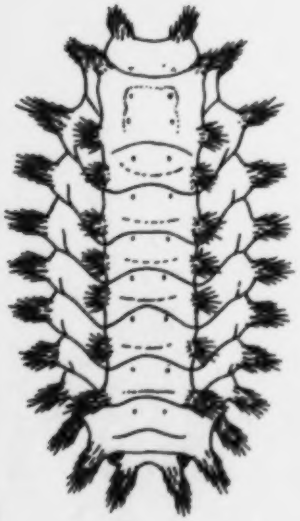
PUSS CATERPILLAR
Megalopyge opercularis

BODY NOT FUR-LIKE



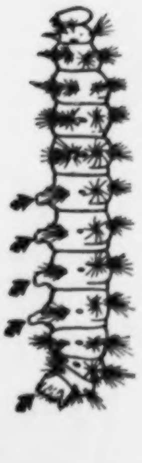
5 PROLEGS

ABOUT 3/4-INCH LONG, YELLOWISH GREEN



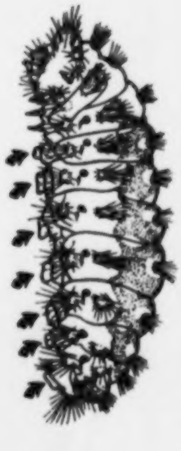
A SLUG CATERPILLAR
Euclea chloris

ABOUT 2 INCHES LONG, RED AND WHITE



IO MOTH CATERPILLAR
Automeris io

7 PROLEGS



A FLANNEL MOTH CATERPILLAR
Norape cretata

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

MOTHS: KEY TO SOME SPECIES COMMONLY ASSOCIATED WITH STORED FOOD

Harold George Scott

1. Caterpillars 2
   Adult moths 5

2. Pinkish larvae up to 3/5-inch long living in silken tubes and producing matter webbing in the infested food *(Anagasta kuhniella)* . . . . MEDITERRANEAN FLOUR MOTH
   Whitish larvae with or without black or orange markings 3

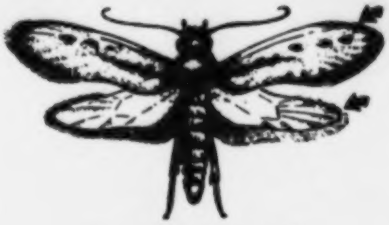
3. Black head and prothorax; orange markings at both ends of the body; living in silken tubes *(Pyralis farinalis)* . . . . MEAL MOTH
   Without black head and prothorax 4

4. White to greenish-white larvae producing matter webbing in the infested food *(Plodia interpunctella)* . . . . INDIAN MEAL MOTH
   Whitish; not producing matted webbing; living inside kernels of grain *(Sitotroga cerealella)* . . . . ANGOUMOIS GRAIN MOTH

5. Wings unicolorous to slightly spotted; long fringe at rear of wings *(Sitotroga cerealella)* . . . . ANGOUMOIS GRAIN MOTH
   Wings heavily dark marked 6

6. Distal half of front wings dark; basal half light *(Plodia interpunctella)* . . . . INDIAN MEAL MOTH
   Wings not so marked 7

7. Basal and distal thirds of front wings dark; middle portion of front wings light *(Pyralis farinalis)* . . . . MEAL MOTH
   Front wings pale gray with transverse wavy black markings *(Anagasta kuhniella)* . . . . MEDITERRANEAN FLOUR MOTH

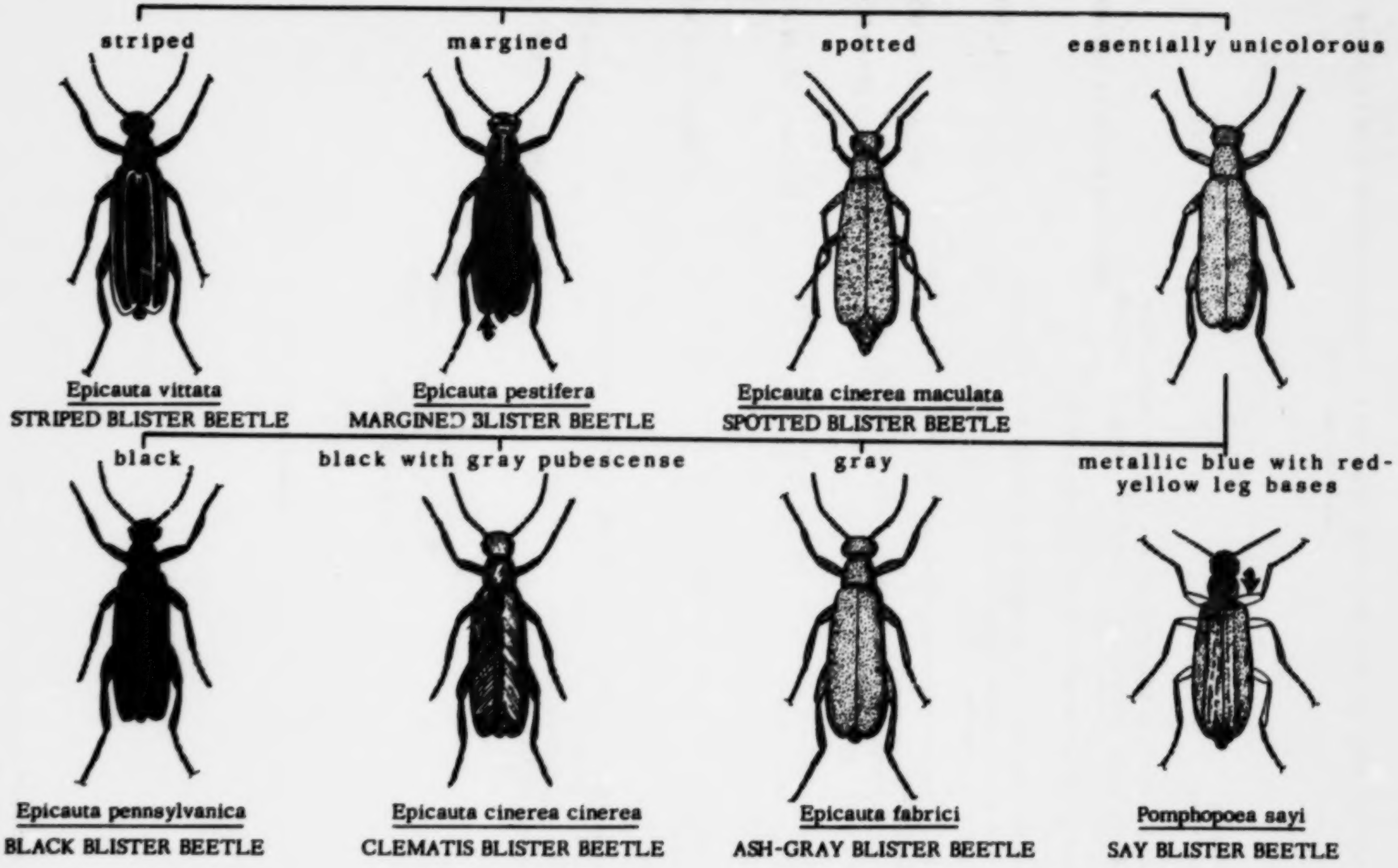


Angoumois Grain Moth

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch,
Atlanta, Georgia – 1963

BLISTER BEETLES: KEY TO SOME COMMON UNITED STATES SPECIES

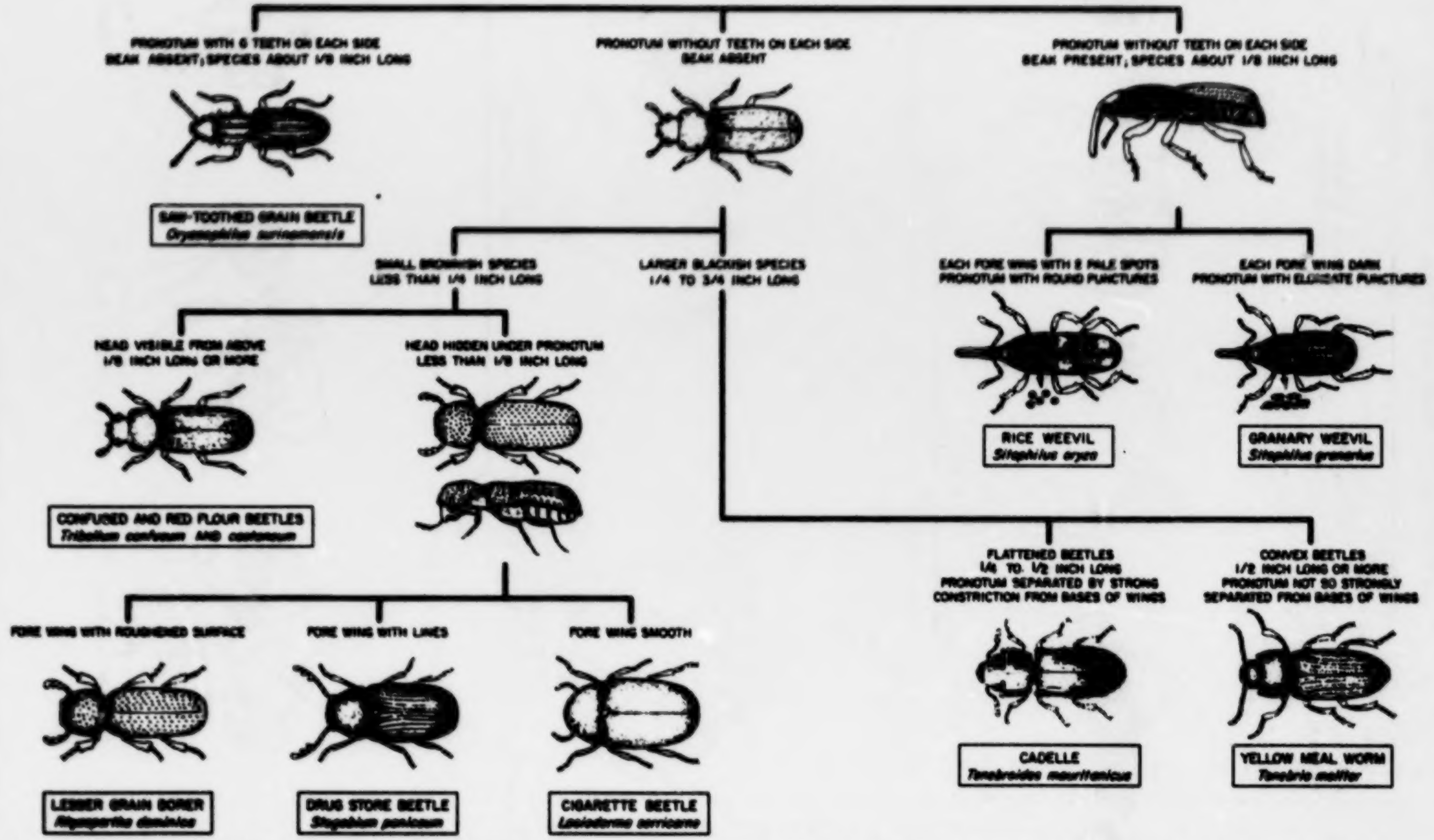
Harold George Scott and Chester J. Stojanovich


striped
margined
spotted
essentially unicolorous
Epicauta vittata
STRIPED BLISTER BEETLE
Epicauta pestifera
MARGINED BLISTER BEETLE
Epicauta cinerea maculata
SPOTTED BLISTER BEETLE
black
black with gray pubescense
gray
metallic blue with red-yellow leg bases
Epicauta pennsylvanica
BLACK BLISTER BEETLE
Epicauta cinerea cinerea
CLEMATIS BLISTER BEETLE
Epicauta fabrici
ASH-GRAY BLISTER BEETLE
Pomphopoea sayi
SAY BLISTER BEETLE

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

BEETLES: PICTORIAL KEY TO SOME SPECIES COMMONLY ASSOCIATED WITH STORED FOODS

Harry D. Pratt


PRONOTUM WITH 6 TEETH ON EACH SIDE
BEAK ABSENT; SPECIES ABOUT 1/8 INCH LONG
PRONOTUM WITHOUT TEETH ON EACH SIDE
BEAK ABSENT
PRONOTUM WITHOUT TEETH ON EACH SIDE
BEAK PRESENT; SPECIES ABOUT 1/8 INCH LONG
SAW-TOOTHED GRAIN BEETLE
Oryzaephilus surinamensis
SMALL BROWNISH SPECIES
LESS THAN 1/4 INCH LONG
LARGER BLACKISH SPECIES
1/4 TO 3/4 INCH LONG
EACH FORE WING WITH 2 PALE SPOTS
PRONOTUM WITH ROUND PUNCTURES
EACH FORE WING DARK
PRONOTUM WITH ELONGATE PUNCTURES
HEAD VISIBLE FROM ABOVE
1/8 INCH LONG OR MORE
HEAD HIDDEN UNDER PRONOTUM
LESS THAN 1/8 INCH LONG
RICE WEEVIL
Sitophilus oryza
GRANARY WEEVIL
Sitophilus granarius
CONFUSED AND RED FLOUR BEETLES
Tribolium confusum AND *castaneum*
FLATTENED BEETLES
1/4 TO 1/2 INCH LONG
PRONOTUM SEPARATED BY STRONG
CONSTRICTION FROM BASES OF WINGS
CONVEX BEETLES
1/2 INCH LONG OR MORE
PRONOTUM NOT SO STRONGLY
SEPARATED FROM BASES OF WINGS
FORE WING WITH ROUGHENED SURFACE
FORE WING WITH LINES
FORE WING SMOOTH
CADELLE
Tenebroides mauritanicus
YELLOW MEAL WORM
Tenebrio molitor
LESSER GRAIN BORER
Rhyzopertha dominica
DRUG STORE BEETLE
Stegobium paniceum
CIGARETTE BEETLE
Lasioderma serricorne

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STINGING HYMENOPTERA:
PICTORIAL KEY TO SOME COMMON UNITED STATES FAMILIES

Harold George Scott and Chester J. Stojanovich

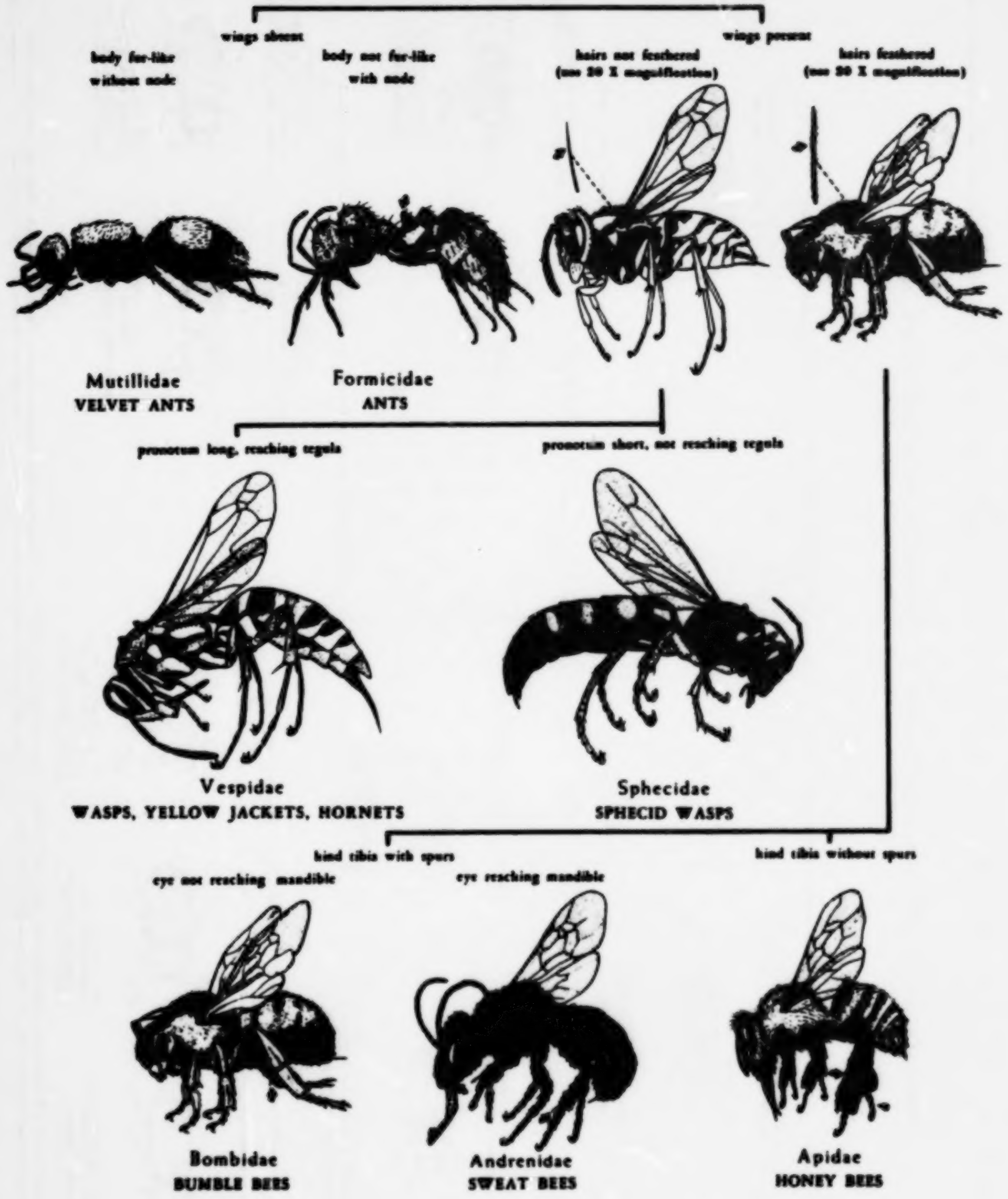
wings absent
wings present
body fur-like
without node
body not fur-like
with node
hairs not feathered
(use 20 X magnification)
hairs feathered
(use 20 X magnification)
Mutillidae
VELVET ANTS
Formicidae
ANTS
pronotum long, reaching tegula
pronotum short, not reaching tegula
Vespidae
WASPS, YELLOW JACKETS, HORNETS
Sphecidae
SPHECID WASPS
hind tibia with spurs
hind tibia without spurs
eye not reaching mandible
eye reaching mandible
Bombidae
BUMBLE BEES
Andrenidae
SWEAT BEES
Apidae
HONEY BEES

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DIAGRAM OF SOCIAL WASP

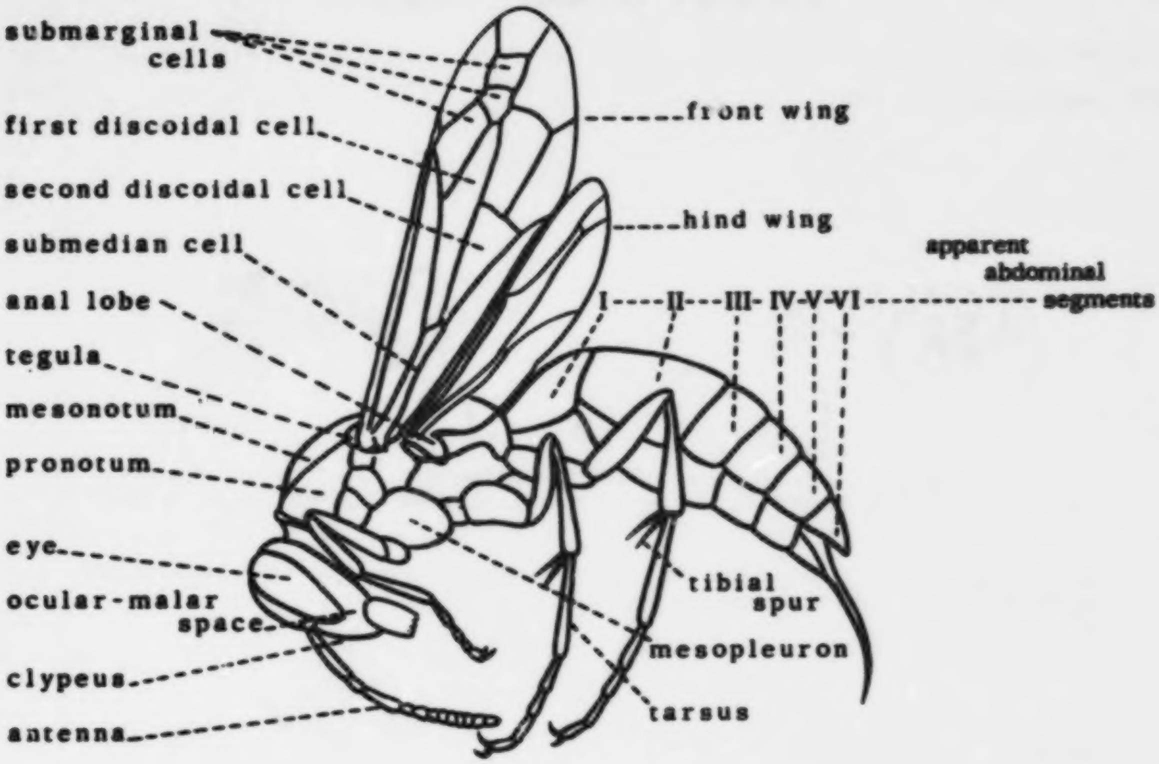
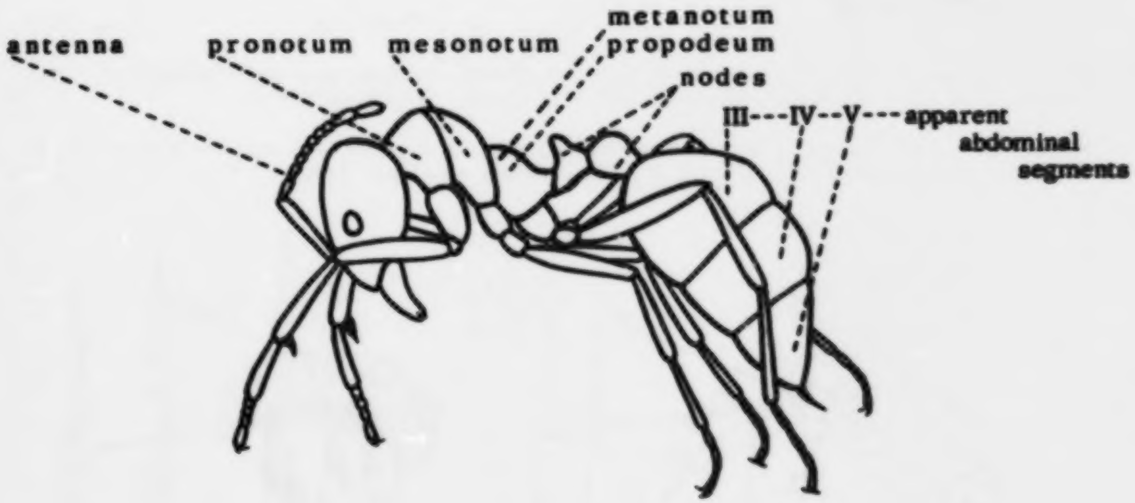

submarginal cells
first discoidal cell
second discoidal cell
submedian cell
anal lobe
tegula
mesonotum
pronotum
eye
ocular-malar space
clypeus
antenna
front wing
hind wing
apparent abdominal segments
I
II
III
IV
V
VI
tibial spur
mesopleuron
tarsus

DIAGRAM OF FIRE ANT


antenna
pronotum
mesonotum
metanotum
propodeum
nodes
III
IV
V
apparent abdominal segments

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963- Chester J. Stojanovich

● 102

HYMENOPTERA: KEY TO SOME COMMON SPECIES WHICH STING MAN

Harry D. Pratt and Chester J. Stojanovich

1. With wings (Fig. 1 A)...2

   Without wings (Fig. 1 B)...32

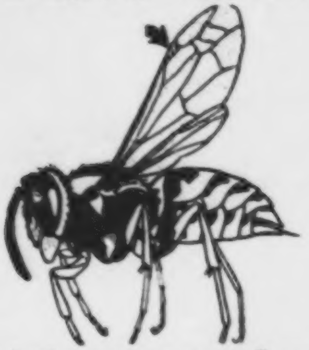


Fig. 1 A

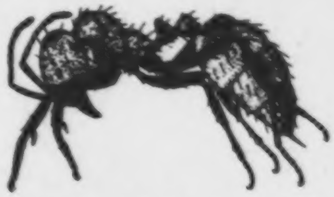


Fig. 1 B

2. First (and sometimes second) segment of the abdomen node-like, clearly separated above and below from rest of abdomen (Fig. 2 A). Nest in ground, wood, or buildings (Family Formicidae)..ANT

   Abdomen with or without some constriction of first abdominal segments, but without true node formation of basal abdominal segments (Fig. 2 B)..3

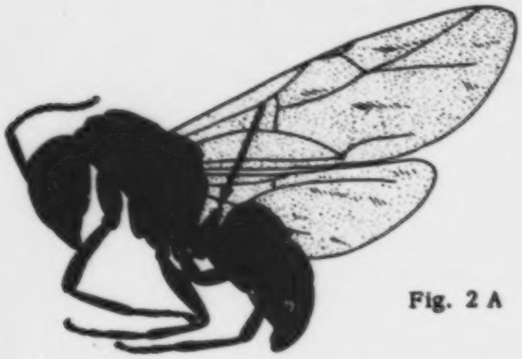


Fig. 2 A

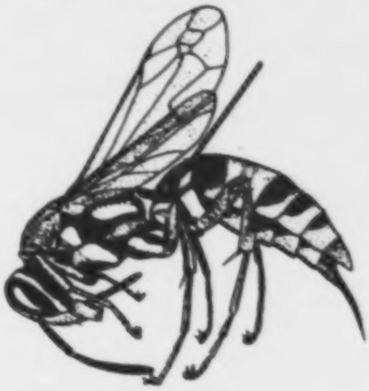


Fig. 2 B

3. All hairs on body simple, unbranched; hind tarsus slender, first segment not broadened or thickened (Fig. 3 A). (Superfamilies Vespoidea and Sphecoidea). Wasps and Hornets.................. 4

   At least some hairs on thorax branched or plumose; hind tarsus with first segment broadened and thickened, often densely hairy (Fig. 3 B). (Superfamily Apoidea). Bees....................... 27

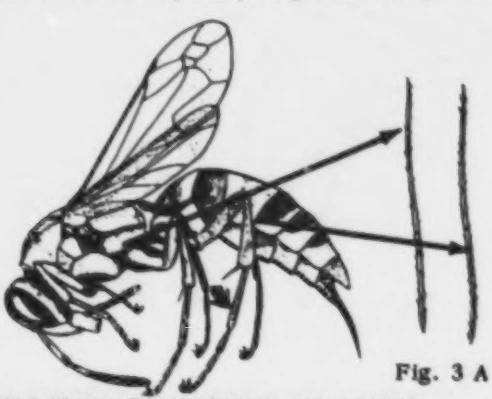


Fig. 3 A

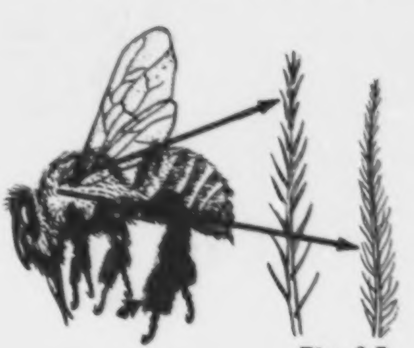


Fig. 3 B

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4. Pronotum extending entirely, or almost back, to the tegula (the scale covering base of fore-wing), its hind angles not lobed (Fig. 4 A). (Superfamily Vespoidea).................................5

Pronotum shortened, more or less collar-like, not extending back to tegula, its hind angles often produced into lobes (Fig. 4 B). (Superfamily Sphecoidea)..22

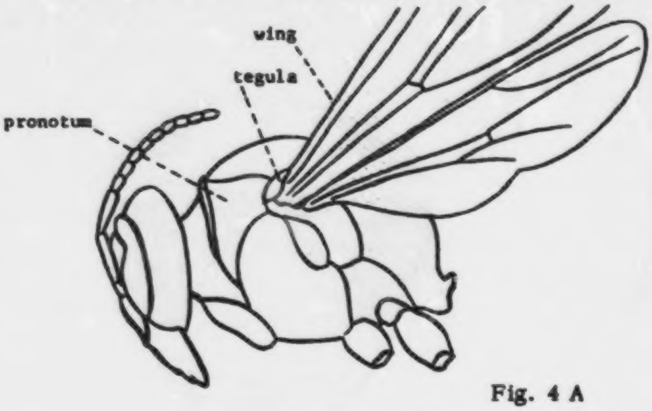

wing
tegula
pronotum

Fig. 4 A

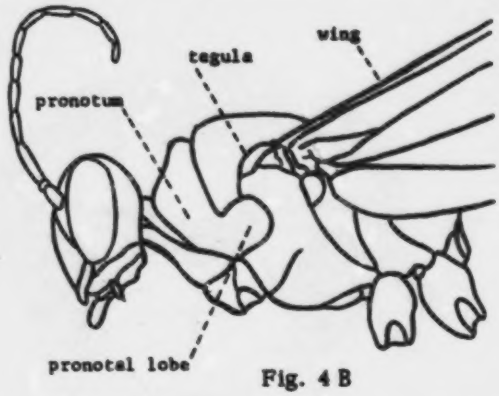

wing
tegula
pronotum
pronotal lobe

Fig. 4 B

5. Fore wing almost always folded when in repose; first discoidal cell very long, as a rule much longer than the submedian cell (Fig. 5 A). Both solitary and colonial species (Family Vespidae)......6

Fore wing very rarely folded; first discoidal cell shorter than submedian cell (Fig. 5 B). Solitary species...21

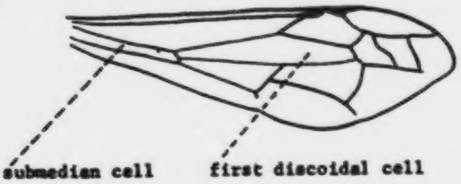

submedian cell
first discoidal cell

Fig. 5 A

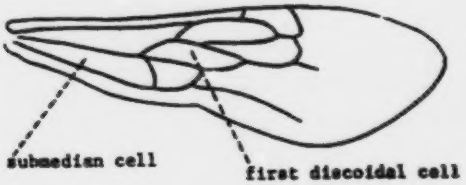

submedian cell
first discoidal cell

Fig. 5 B

6. One spur at tip of middle tibia; claws bifid, split at tip (Fig. 6 A). (Subfamily Eumeninae)........ Solitary Wasps...18

Two spurs at tip of middle tibia; claws tapering to point (Fig. 6 B)...............................7

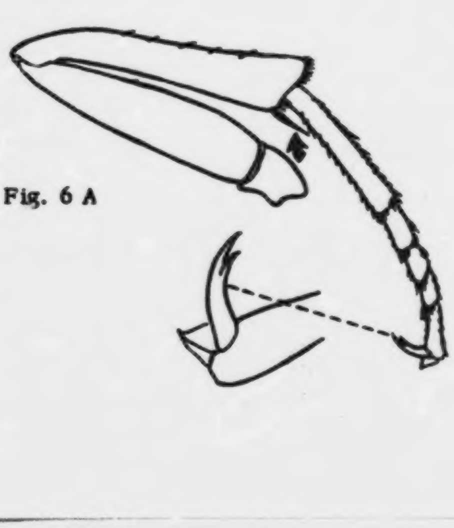


Fig. 6 A

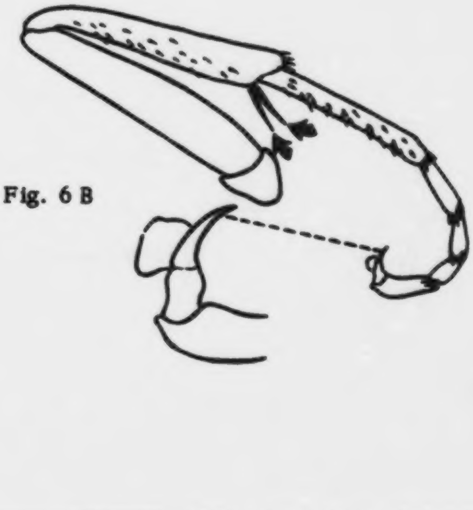


Fig. 6 B

7. Clypeus (upper lip) broadly truncate and more or less notched at apex (Fig. 7 A); hind wing without a lobe at anal angle (Fig. 7 B). (Subfamily Vespinae). Hornets, Yellow Jackets............8

Clypeus somewhat pointed at apex (Fig. 7 C); hind wing with a lobe at anal angle (Fig. 7 D)....... (Subfamily Polistinae). Paper Wasps...15

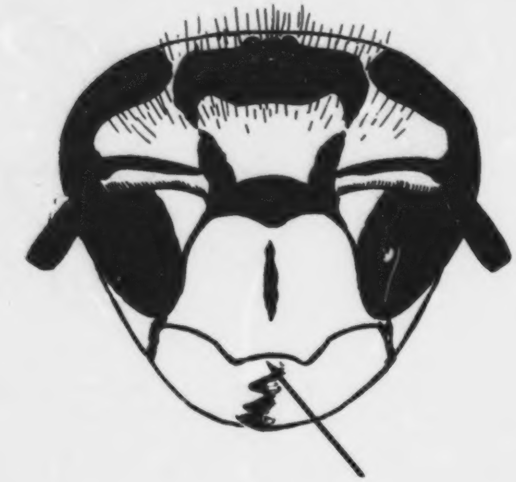


Fig. 7 A

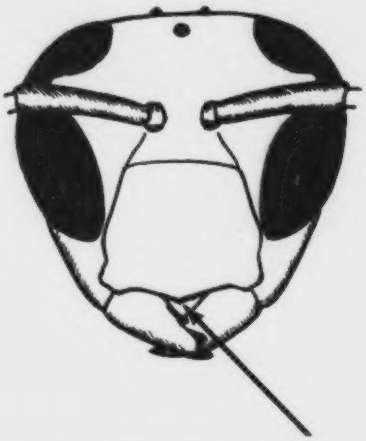


Fig. 7 C

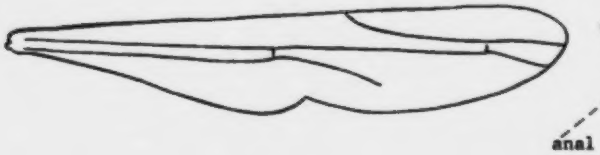


Fig. 7 B

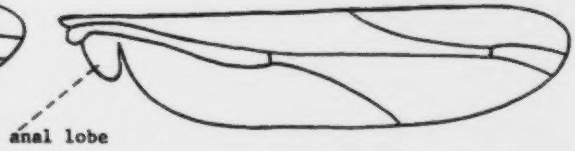


Fig. 7 D

8. Oculo-malar space long, more than half the length of next to last antennal segment; vertical carina on pronotum (Fig. 8 A)...9

Oculo-malar space short, less than half the length of next to last antennal segment; no vertical carina on pronotum (Fig. 8 B)...11

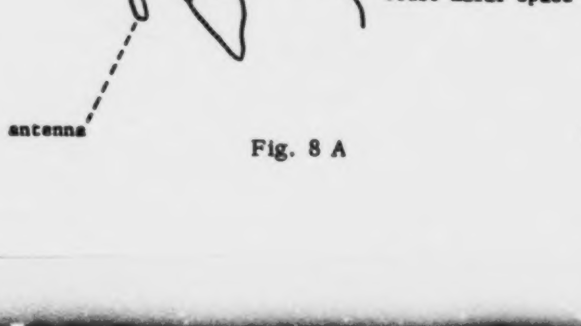

pronotum
vertical carina
oculo-malar space
antenna

Fig. 8 A

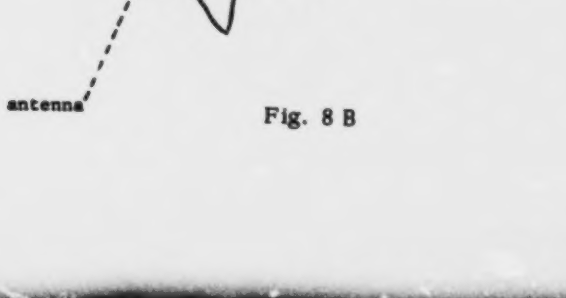

pronotum
oculo-malar space
antenna

Fig. 8 B

9. Very large species, 20-30 mm. long, extensively reddish-brown; postocellar area of vertex at least as long as ocellar triangle in dorsal view (Fig. 9 A). Builds paper nest in homes or hollow trees. (Vespa crabo germana)......................................GIANT HORNET

Smaller species, 8-20 mm. long; black species with white, ivory white, or yellowish markings; postocellar area of vertex not as long as ocellar triangle (Fig. 9 B)........................ 10

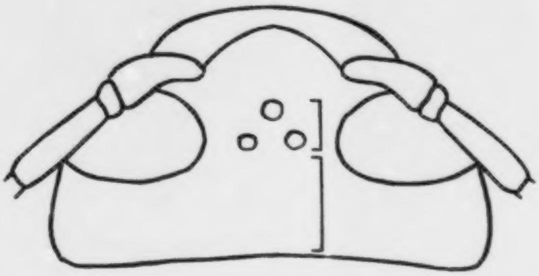


Fig. 9 A

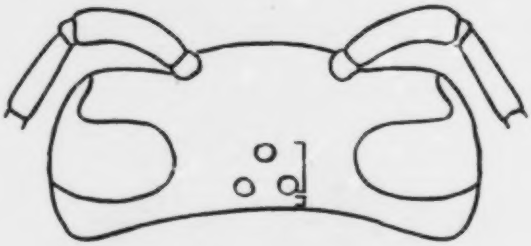
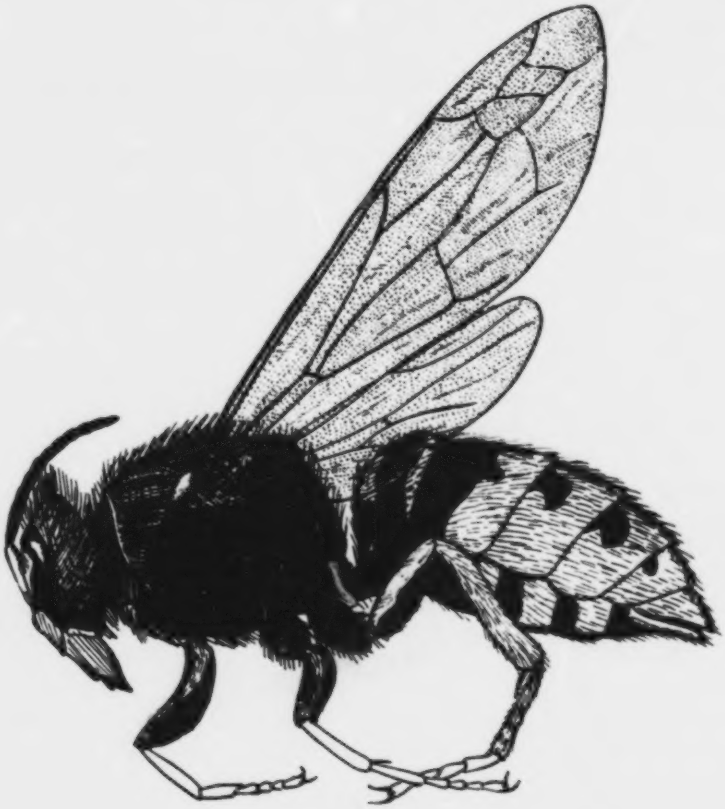


Fig. 9 B



10. Black and white species; first and second abdominal segments entirely black, sometimes with very narrow pale markings at tip of first segments in some males (Fig. 10 A). Builds enclosed globular nests under eaves or in trees. (Vespula maculata)............BALD-FACED HORNET

Black and yellow species; yellowish posterior margins of first and second abdominal segments deeply notched (Fig. 10 B). Builds globular paper nests under eaves or in trees................ (Vespula arenaria)..A YELLOW JACKET

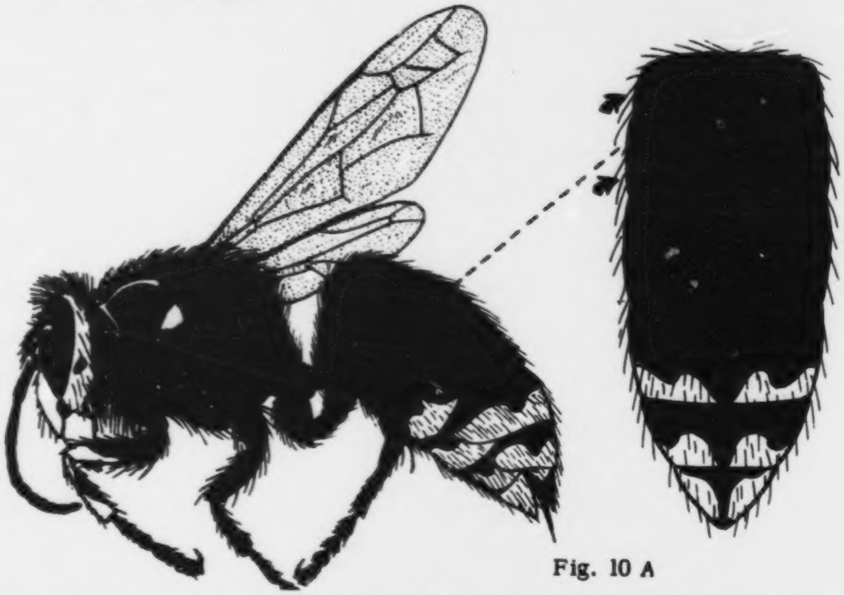


Fig. 10 A

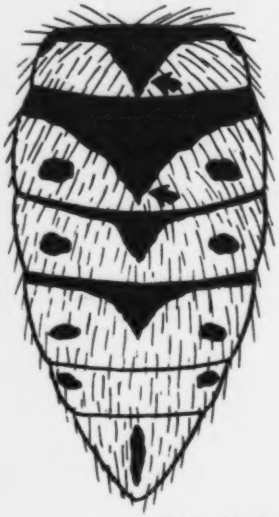


Fig. 10 B

11. Black and white species (Fig. 11 A). Builds paper nest in ground or on trees.................. (Vespula consobrina)...A HORNET

Black and yellowish species (Fig. 11 B). All build paper nests in ground.....................12

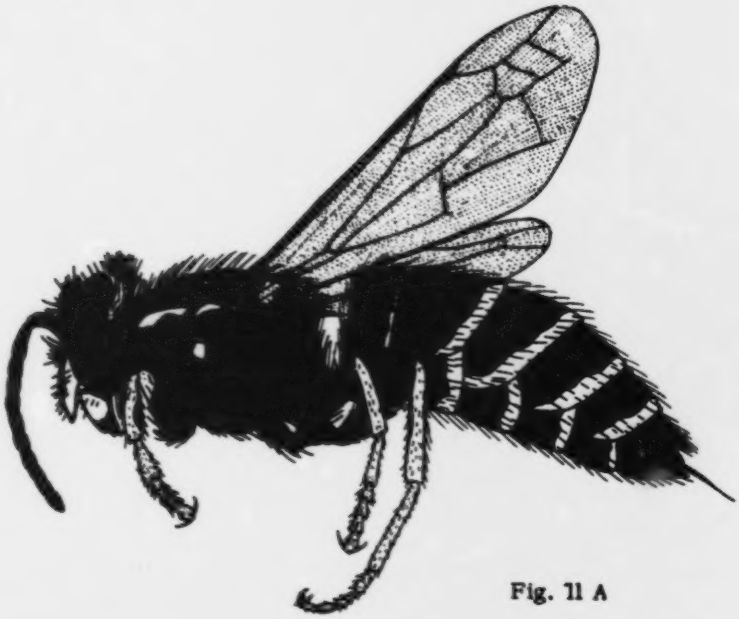


Fig. 11 A

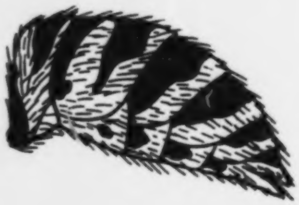


Fig. 11 B

12. Mesonotum with two, broad, longitudinal, curved yellowish stripes reaching almost from front to hind margins (Fig. 12 A). Eastern species (Vespula squamosa). California and Oregon species (Vespula sulphurea).......................................A YELLOW JACKET

Mesonotum entirely black, or with two short yellowish stripes near scutellum (Fig. 12 B).....13

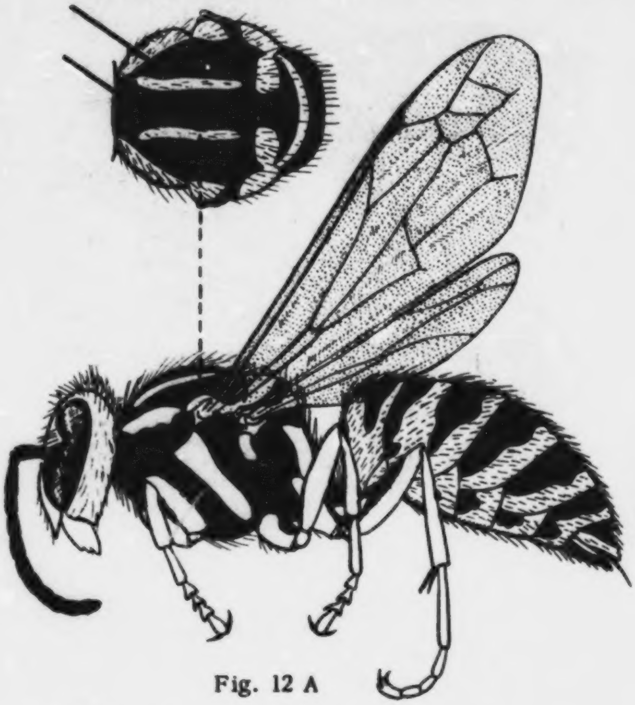


Fig. 12 A

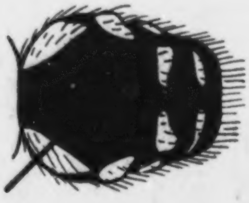


Fig. 12 B

13. Yellowish postero-lateral margins of pronotum usually even, parallel-sided; clypeus with broad, dark, longitudinal stripe, often anchor-shaped (Fig. 13 A & B). Northern species............ (Vespula vulgaris)..A YELLOW JACKET

Yellowish postero-lateral margin of pronotum not parallel-sided; clypeus with short dark median stripe or one or more small dark spots (Fig. 13 C & D)....................................14

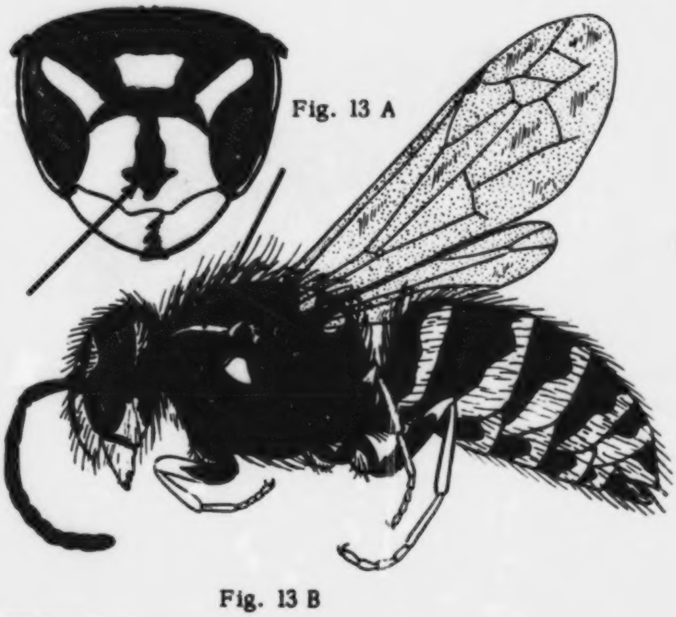


Fig. 13 A

Fig. 13 B

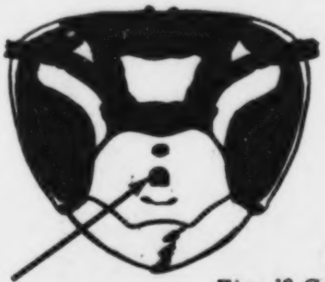


Fig. 13 C

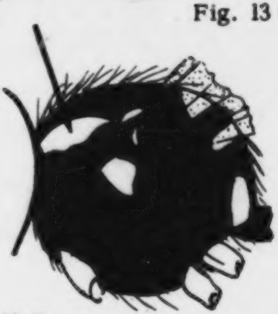


Fig. 13 D

14. First antennal segment largely yellowish in front; eyes encircled by yellowish band on upper three-fourths (Fig. 14 A). Western species (Vespula pennsylvanica)...... A YELLOW JACKET

First antennal segment largely or entirely blackish; eyes with a blackish area dorsally separating pale anterior and posterior orbital bands (Fig. 14 B). Eastern species (Vespula maculifrons).. A YELLOW JACKET

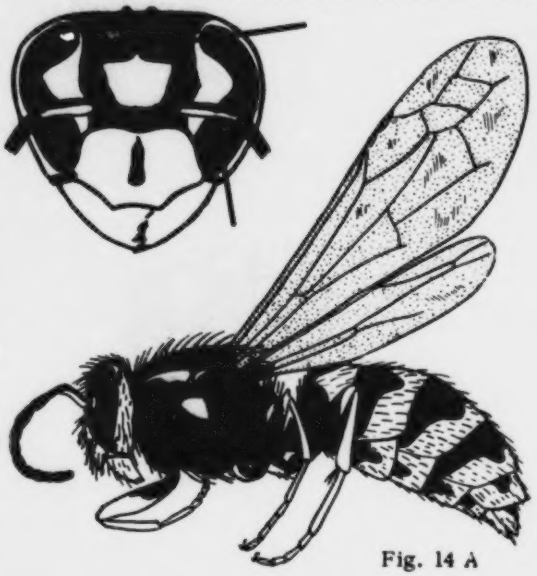


Fig. 14 A

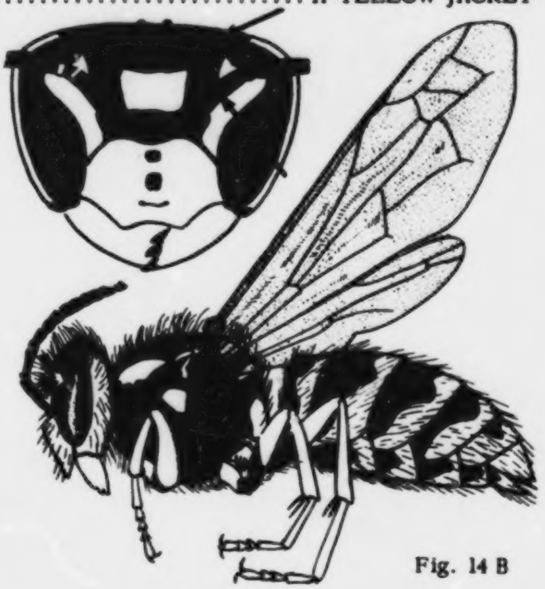


Fig. 14 B

15. Body and all legs entirely or largely orange-colored (Fig. 15 A). Builds paper combs in walls of house or hollow trees. (Polistes rubiginosus)........................ORANGE PAPER WASP

Body with some blackish markings; at least hind tarsi pale-colored (Fig. 15 B)...............16

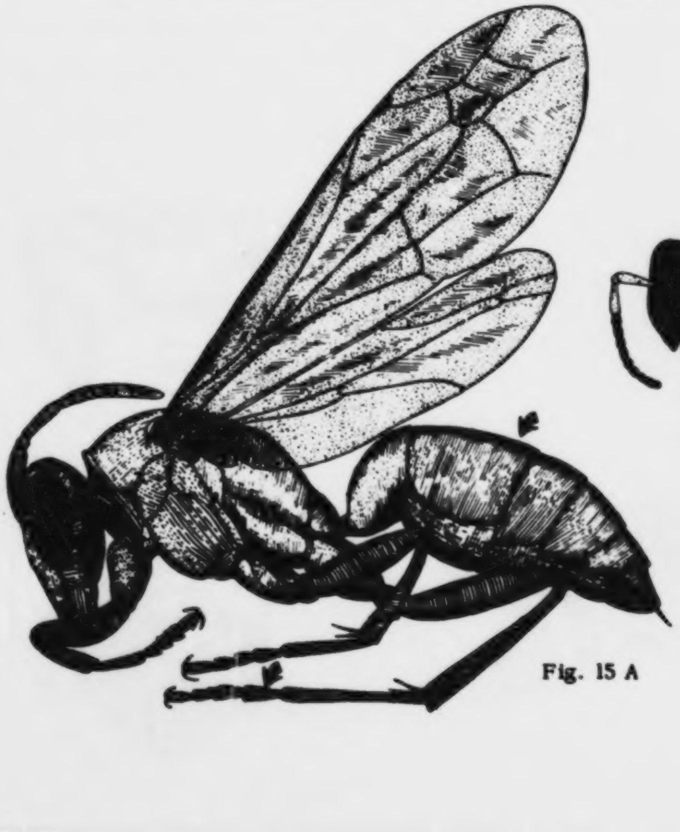


Fig. 15 A

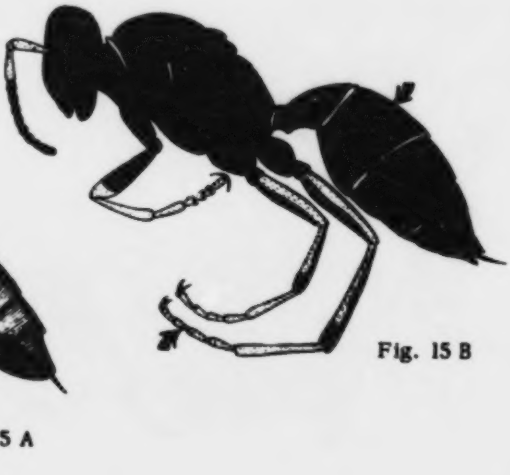


Fig. 15 B

16. Abdominal segments with blackish, yellowish, and reddish markings; mesonotum reddish; a yellowish band behind ocelli (Fig. 16 A). Builds single or double paper combs under eaves or in outbuildings. (*Polistes exclamans*)..ZEBRA PAPER WASP

Abdomen largely blackish, with one or more pale bands starting at posterior margin of first or second segment; mesonotum largely blackish; no yellowish band behind ocelli (Fig. 16 B)...... 17

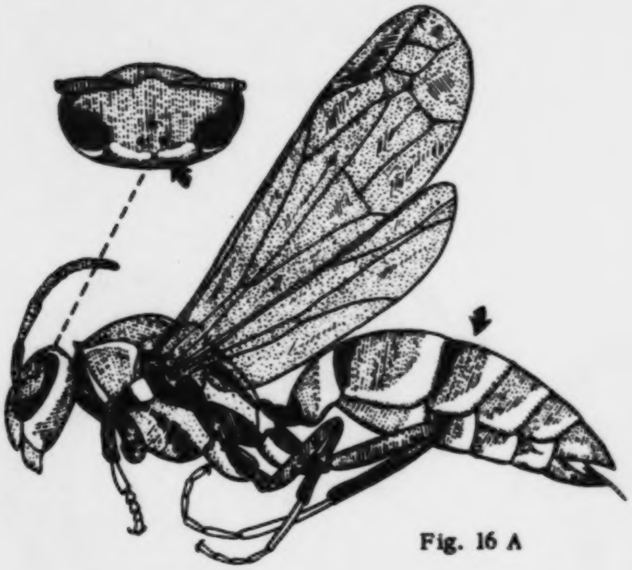


Fig. 16 A

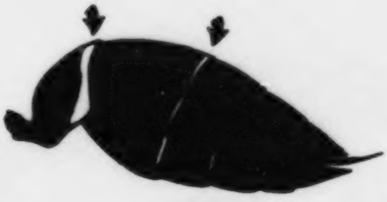


Fig. 16 B

17. Large species 20-25 mm. long, propodeum with coarse transverse striae (Fig. 17 A). Builds paper combs in bushes or trees. (*Polistes annularis*).................... LARGE PAPER WASP

Medium-sized species, 12-17 mm. long; propodeum with fine striae or essentially smooth (Fig. 17 B). Builds paper combs under eaves or in buildings. (*Polistes fuscatus pallipes*)..DARK PAPER WASP

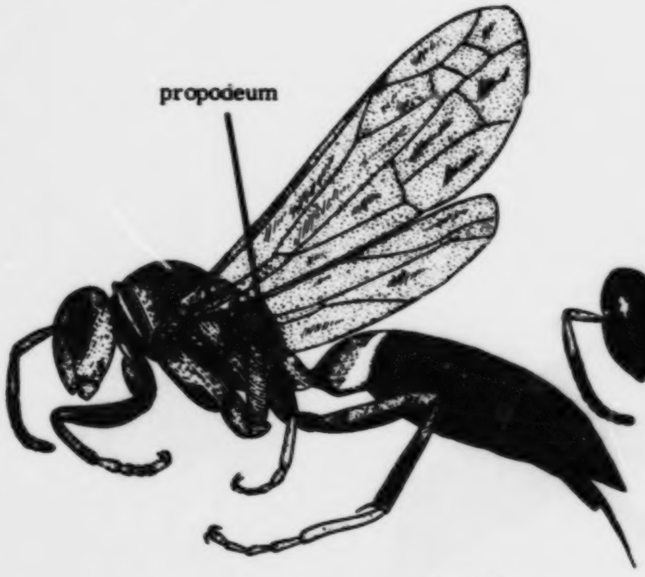


Fig. 17 A

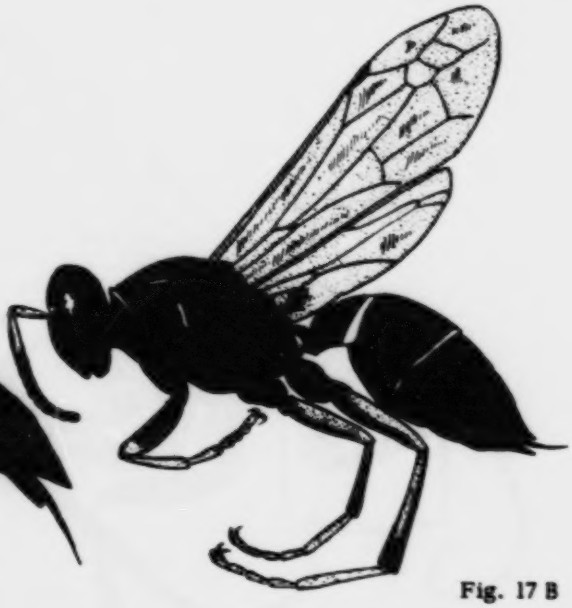


Fig. 17 B

18. Slender species with extremely elongate first abdominal segment (Fig. 18 A). Builds small mud, potter nests provisioned with caterpillars. (Eumenes fraterna)................ POTTER WASP

Stocky species, with stout first abdominal segment (Fig. 18 B). Nest in holes in ground or wood, or old mud-dauber nests provisioned with caterpillars. (Odynerus species and Monobia species) .... SOLITARY WASPS

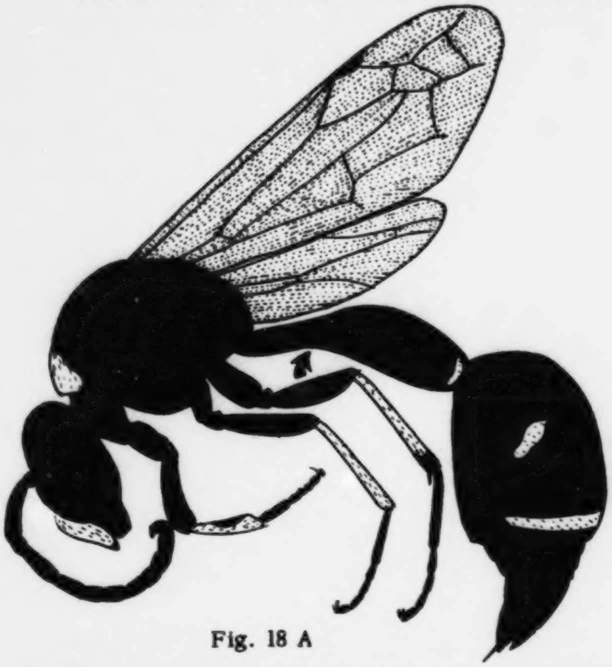


Fig. 18 A

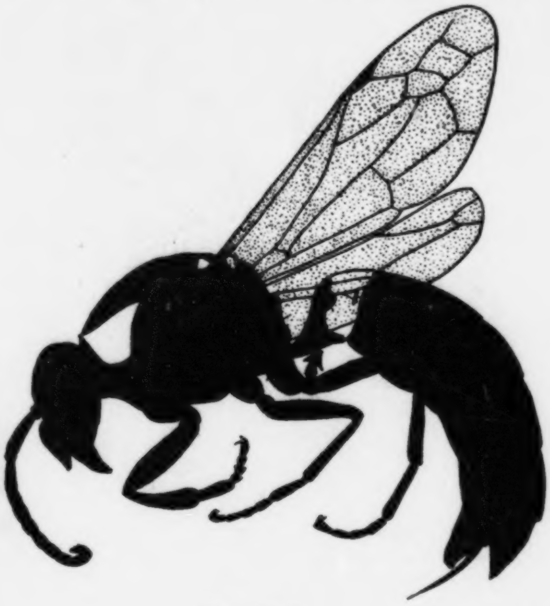


Fig. 18 B

19. Mesopleuron divided by an oblique suture into upper and lower parts (Fig. 19 A). Usually nest in holes in ground provisioned with spiders or tarantulas (Family Psammocharidae)............... .... SPIDER AND TARANTULA WASPS

Mesopleuron not divided by such an oblique suture (Fig. 19 B)................................ 20

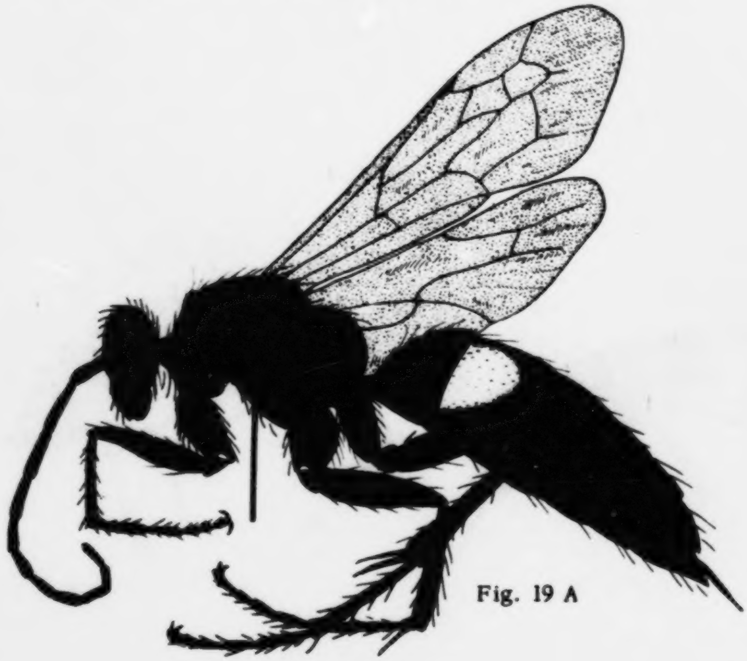


Fig. 19 A

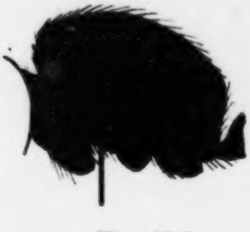


Fig. 19 B

20. Bases of middle and hind coxae not covered by plates (Fig. 20 A). Parasites of other wasps and bees nesting in ground.. VELVET ANTS

Bases of middle, and sometimes hind, coxae covered by plates (Fig. 20 B).................... 21

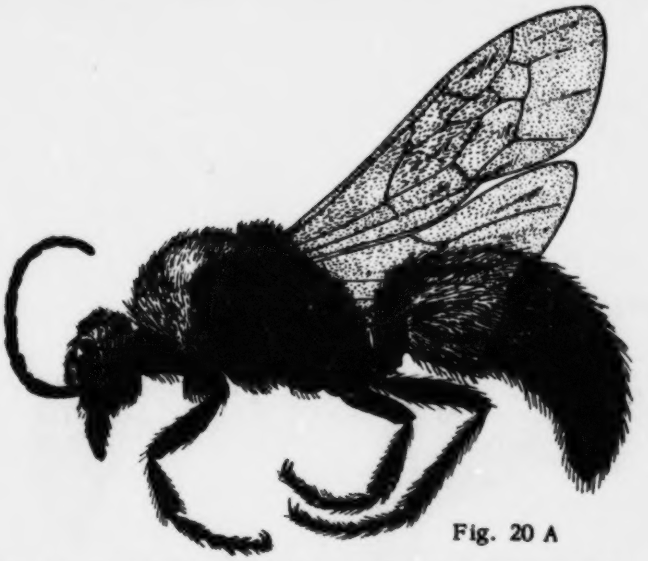


Fig. 20 A

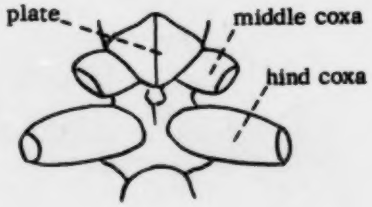


plate
middle coxa
hind coxa

Fig. 20 B

21. Wing membrane beyond cells with wrinkles; inner margin of eye with a sinus; bases of middle and hind coxae covered by plates (Fig. 21 A & B). Male with three spines at tip of abdomen......... (Family Scoliidae).. SCOLIID WASPS

Wing membrane beyond cells without wrinkles; inner margin of eye essentially straight; bases of middle coxae covered by plates (Fig. 21 C & D). Male with a single upturned spine at tip of abdomen. (Family Tiphiidae).. TIPHIID WASPS

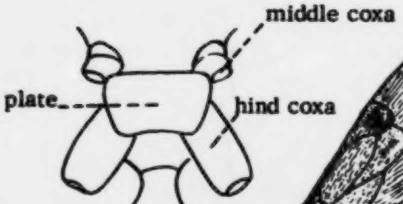

middle coxa
plate
hind coxa

Fig. 21 B

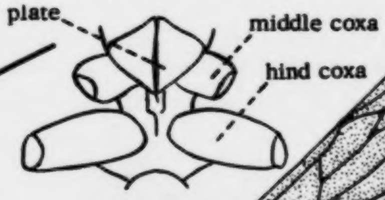


plate
middle coxa
hind coxa

Fig. 21 D

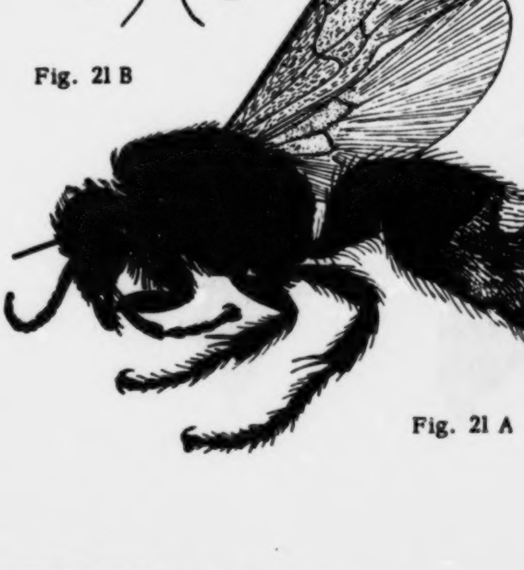


Fig. 21 A

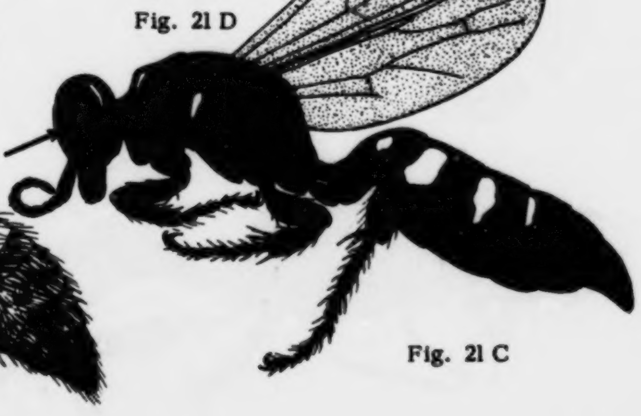


Fig. 21 C

22. Very large species, 30 mm. long or more; first abdominal segment broad and sessile (Fig. 22 A) Nest in holes in ground provisioned with cicadas. (Sphecius speciosus).......CICADA KILLER

Smaller species, less than 25 mm. long; first abdominal segment longer and more slender (Fig. 22 B)..23

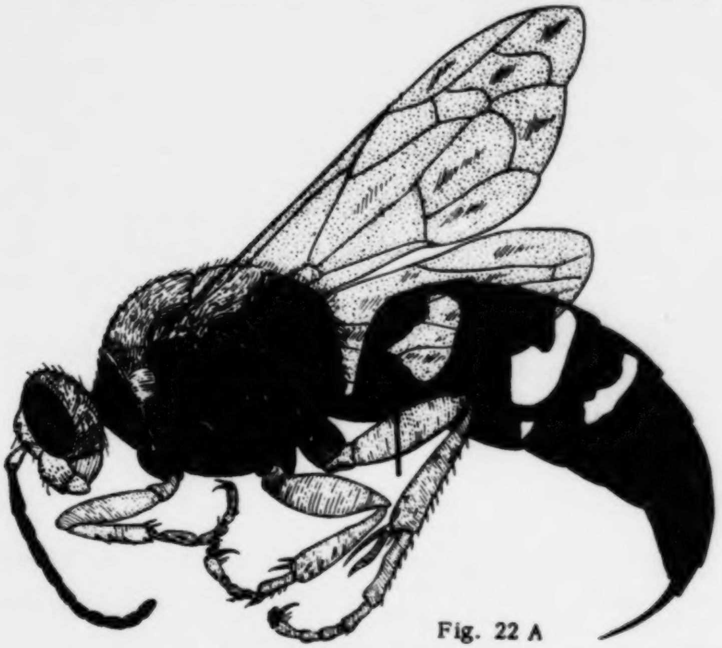


Fig. 22 A

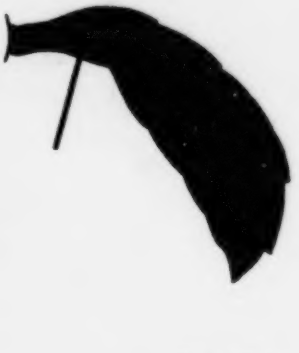


Fig. 22 B

23. Eyes with deep sinus on inner side; one or two clearly defined submarginal cells; dark species with whitish tarsus (Fig. 23 A). Builds organ-pipe mud nests. (Trypoxylon species)..PIPE ORGAN MUD-DAUBER

Eyes nearly straight on inner side; three well-defined submarginal cells; metallic blue, or species with some pale markings on abdomen (Fig. 23 B & C)..................................24

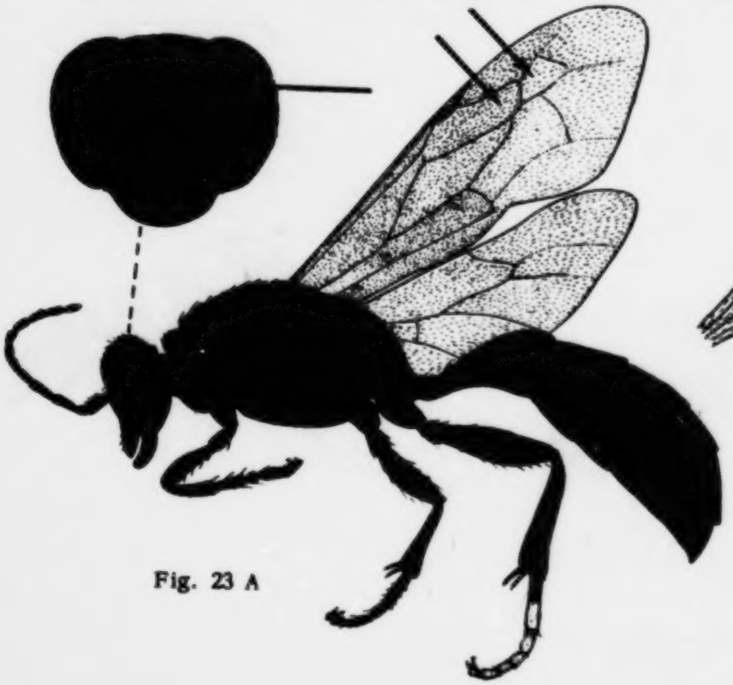


Fig. 23 A

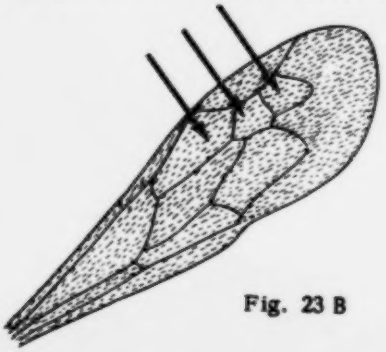


Fig. 23 B

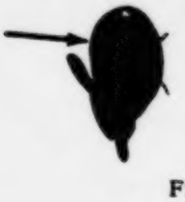


Fig. 23 C

24. Petiole of abdomen two-segmented (Fig. 24 A). Nest in holes in ground. (Sphex species) .... SOLITARY WASP

Petiole of abdomen one-segmented (Fig. 24 B).. 25

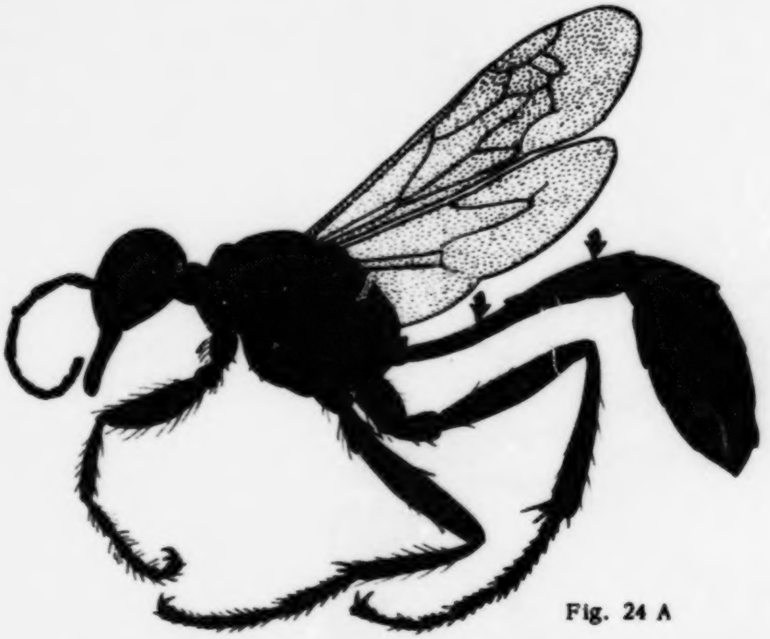


Fig. 24 A

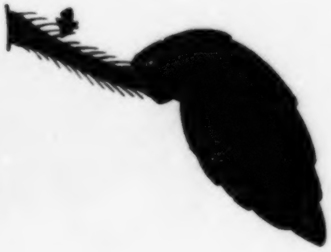


Fig. 24 B

25. Bright metallic bluish species (Fig. 25 A). Builds mud nests provisioned with spiders......... (Chalybion californicum)... BLUE MUD-DAUBER

Darker species with yellowish or orange markings (Fig. 25 B)............................. 26

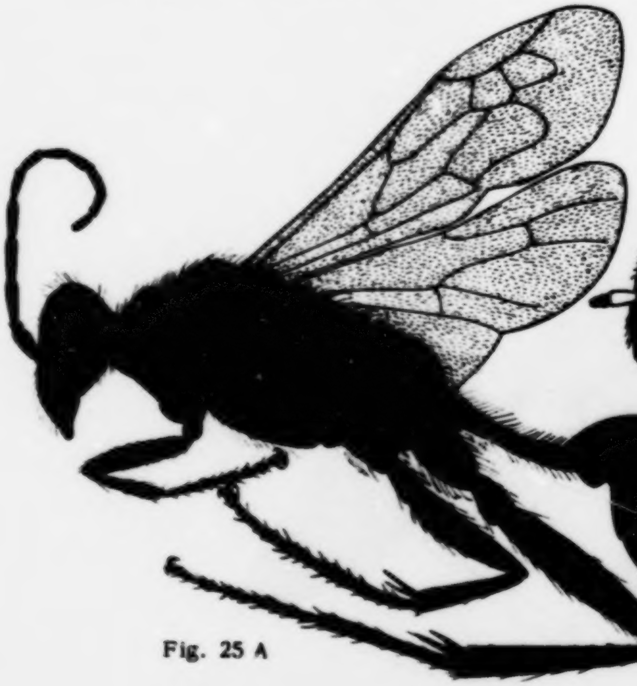


Fig. 25 A

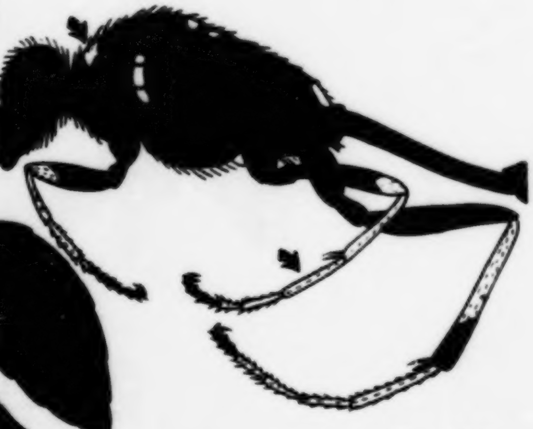


Fig. 25 B

26. Dark species with yellowish markings (Fig. 26 A). Builds mud nests provisioned with spiders. .
(Sceliphron caementarium). . . . . .COMMON MUD-DAUBER

Dark hairy species with orange markings (Fig. 26 B). Nest in holes in ground. . . . .
(Chlorion ichneumonea). . . . . .ORANGE THREAD-WAISTED WASP

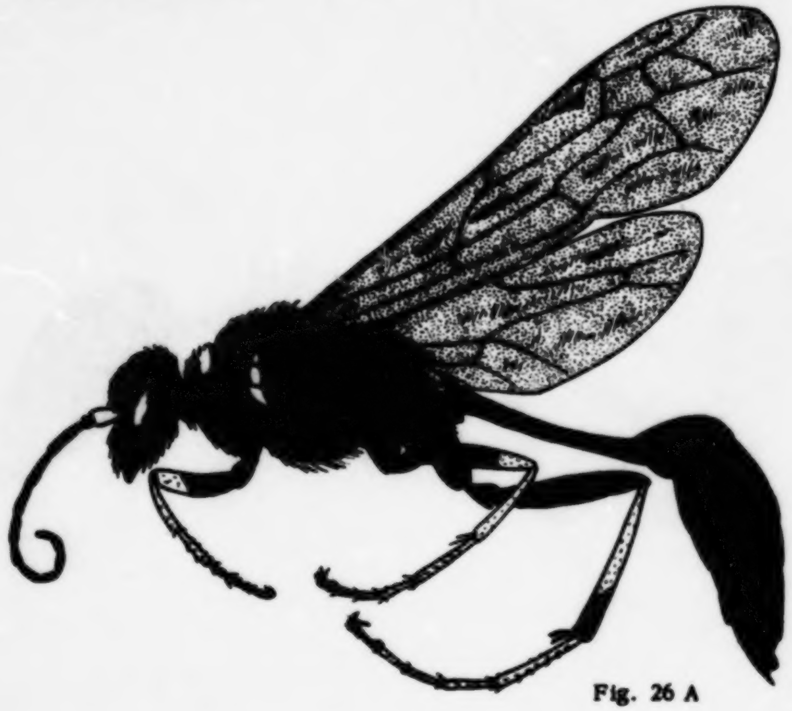


Fig. 26 A

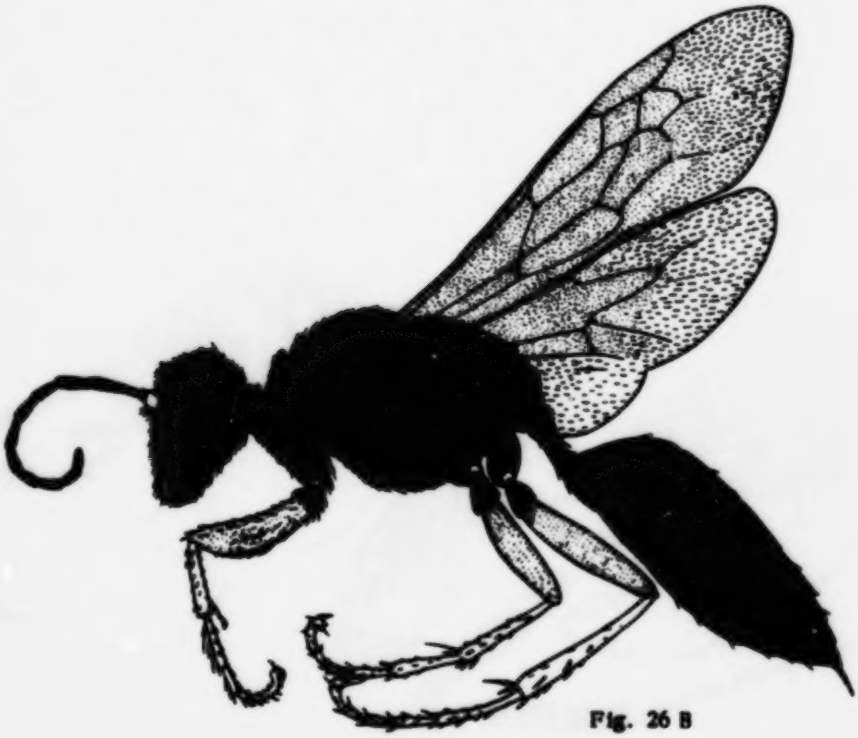


Fig. 26 B

27. Hind tibia without spurs (Fig. 27 A). Colony builds wax combs in bee hives, in houses, and in trees. (*Apis mellifera*).. HONEY BEE

Hind tibia with one or two spurs (Fig. 27 B)... 28

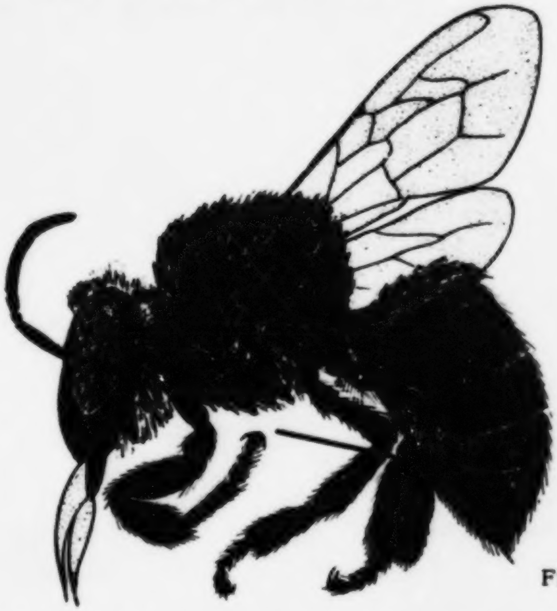


Fig. 27 A

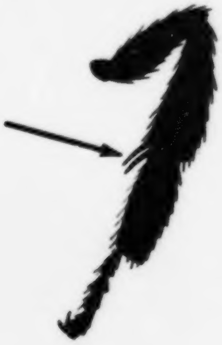


Fig. 27 B

28. Oculo-malar space longer than second segment of antenna; large hairy species with contrasting blackish and yellowish (sometimes reddish) pile (Fig. 28 A). Colony builds wax combs in nests in ground or logs, often in old mouse nests. (Family Bombidae; *Bombus* sp.)..... BUMBLEBEES

Oculo-malar space short, eye reaching (or nearly reaching) base of mandible (Fig. 28 B).....29

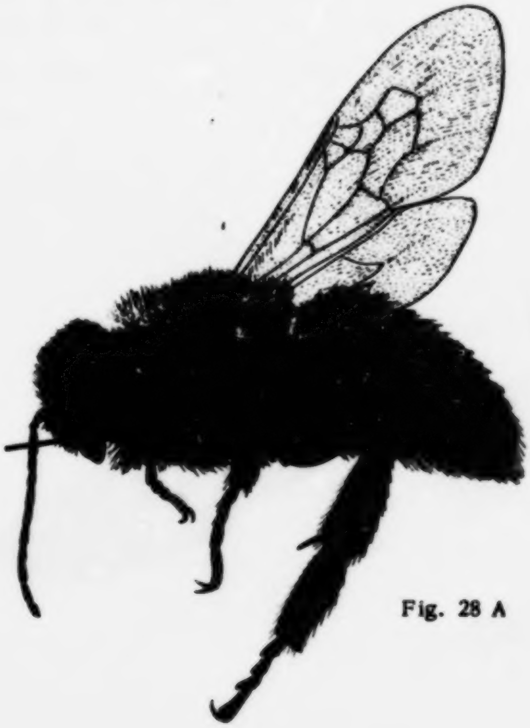


Fig. 28 A

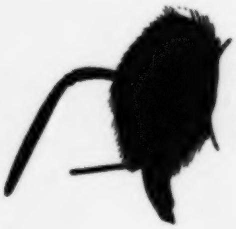


Fig. 28 B

29. Very large species 15-25 mm. long with shiny bluish, nearly hairless upper abdomen; second submarginal cell strongly narrowed anteriorly (Fig. 29 A). Nest in holes bored in wood. (Xylocopa virginica)..CARPENTER BEE

Smaller species 2-14 mm. long, usually with some hairs on upper surface of abdomen, shiny greenish species; second submarginal cell not narrowed anteriorly (Fig. 29 B & C).......... 30

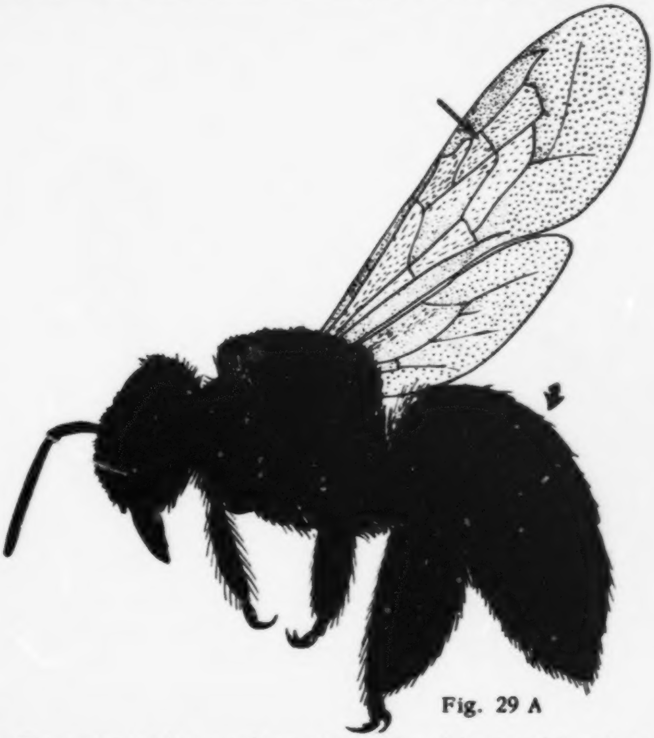


Fig. 29 A

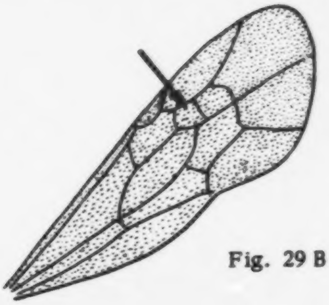


Fig. 29 B

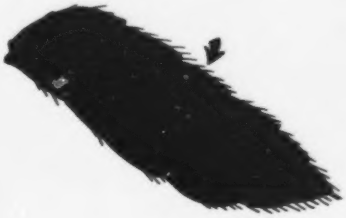


Fig. 29 C

30. Fore-wing with two submarginal cells; abdomen of female with dense hairy patches on underside (Fig. 30 A). Builds nest out of leaves in tree holes (Megachile species)... LEAFCUTTER BEES

Fore-wing with three submarginal cells; abdomen without dense hairy patches on underside (Fig. 30 B & C).. 31

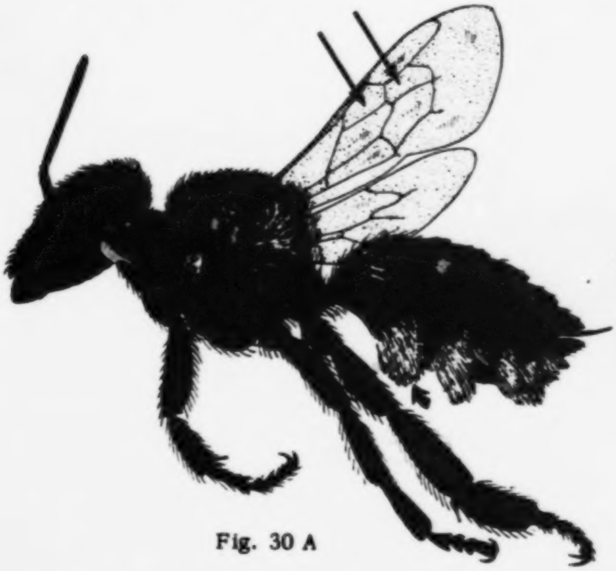


Fig. 30 A

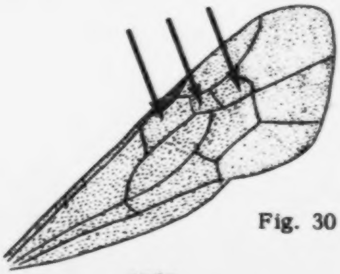


Fig. 30 B

Fig. 30 C

31. Shiny greenish species (Fig. 31 A). Nest in ground. (Augochlora species).. METALLIC SOLITARY BEES

Duller species (Fig. 31 B). Nest in ground. (Halictus and Andrena species).... SOLITARY BEES

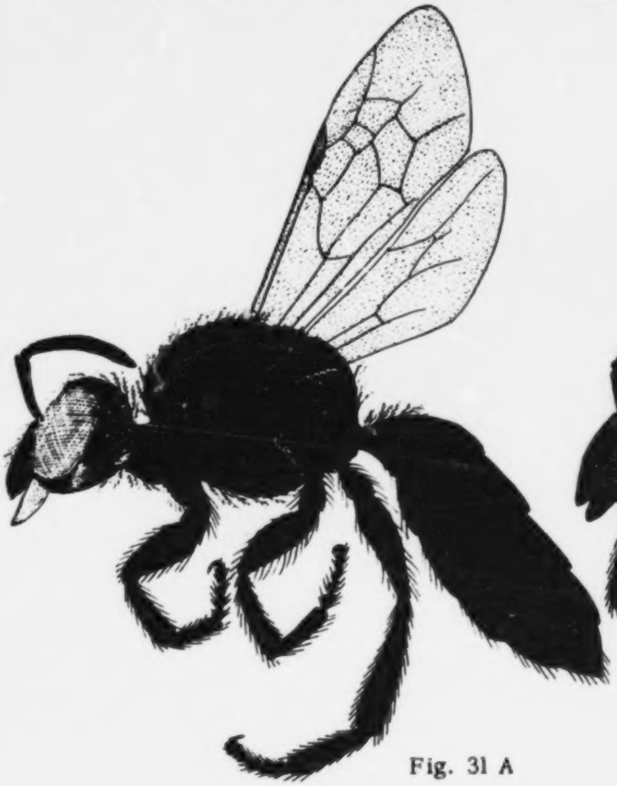


Fig. 31 A

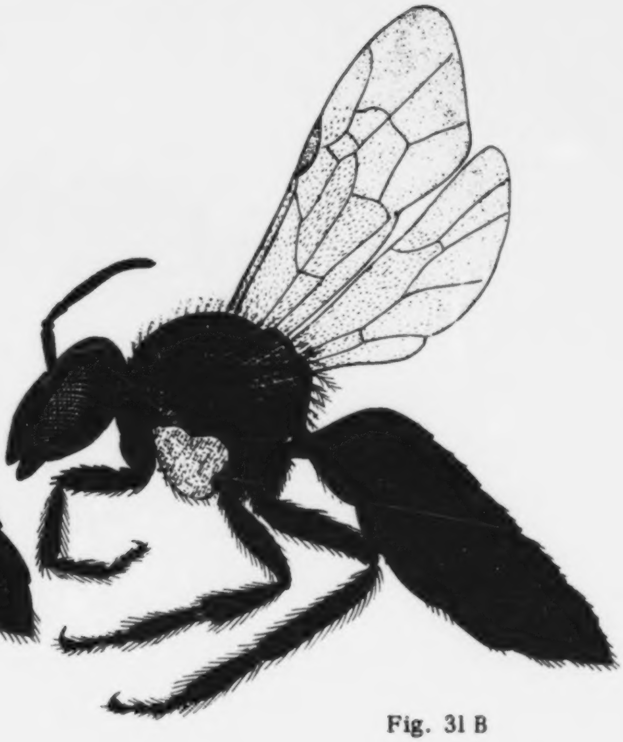


Fig. 31 B

32. First (and sometimes second) segment of abdomen node-like (Fig. 32 A). Build colony nests in ground, under stones, in wood, or in buildings (Family Formicidae)......................ANTS

First and second segments of abdomen not node-like (Fig. 32 B)........................... 33

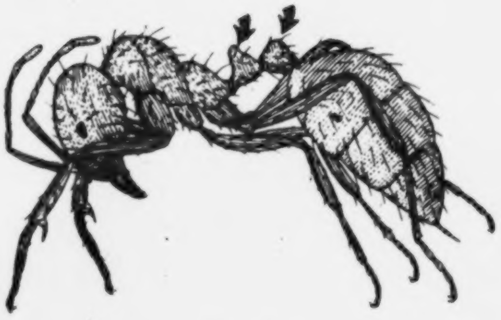


Fig. 32 A

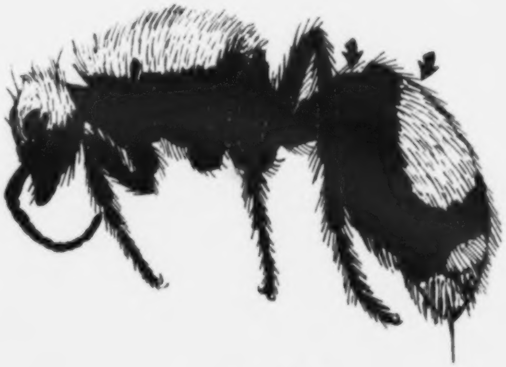


Fig. 32 B

33. Larger species 3-25 mm. long, usually with definite dark and reddish or orange-colored hairs (Fig. 33 A). Parasites of ground-nesting bees and wasps (Family Mutillidae)... VELVET ANTS

Smaller species 1-2 mm. long, with few sparse hairs; body various shades yellowish to brownish (Fig. 33 B). Parasites of wood-boring beetles (Family Bethylidae, Scleroderma species ... . PARASITIC WASPS

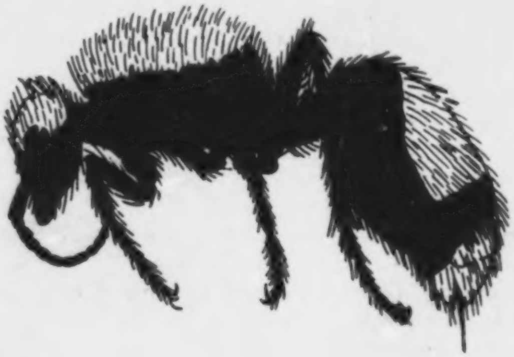


Fig. 33 A

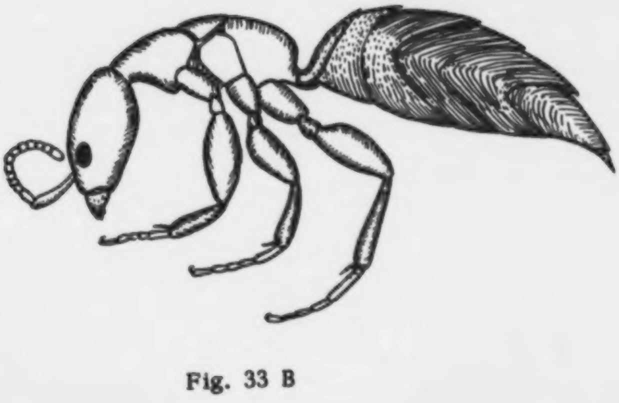


Fig. 33 B

ANTS: KEY TO SOME COMMON SPECIES

Harold George Scott

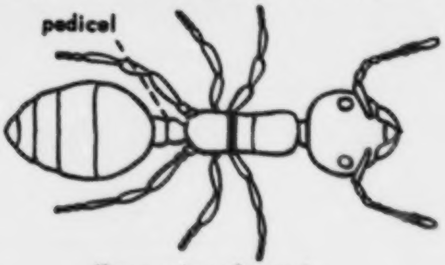
1. Pedicel ("waist") 1-segmented 2
   Pedicel 2-segmented 4

2. Petiole (scale on pedicel) poorly developed, hidden beneath abdomen
   (Tapinoma sessile) . . . . ODOROUS HOUSE ANT
   Petiole well-developed, erect, not hidden beneath abdomen 3

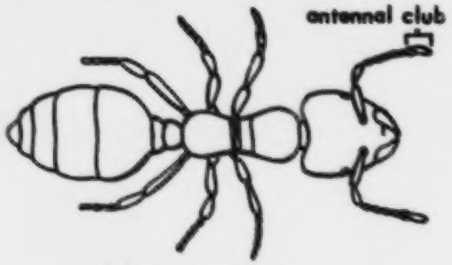
3. Tip of abdomen without circlet of hairs *(Iridomyrmex humilis)* . . . . ARGENTINE ANT
   Tip of abdomen with circlet of hairs *(Camponotus herculeanus pennsylvanicus)* . . . . BLACK CARPENTER ANT

4. Head and thorax with numerous spines *(Atta texana)* . . . . TEXAS LEAF-CUTTING ANT
   Head and thorax spineless or with 1 pair of spines on the posterior thorax 5

5. Thorax and head covered with "fingerprints"; posterior thorax with single pairs of spines *(Tetramorium caespitum)* . . . . PAVEMENT ANT
   Thorax and head without "fingerprints"; posterior thorax without spines 6



Monomorium pharaonis



Solenopsis molesta

6. Antennal club 2-segmented 8
   Antennal club 3-segmented 7

7. Shiny-black *(Monomorium minimum)* . . . . LITTLE BLACK ANT
   Yellowish-red *(Monomorium pharaonis)* . . . . PHARAOH ANT

8. House infesting ants *(Solenopsis molesta)* . . . . THIEF ANT
   Outdoor mound-building ants 9

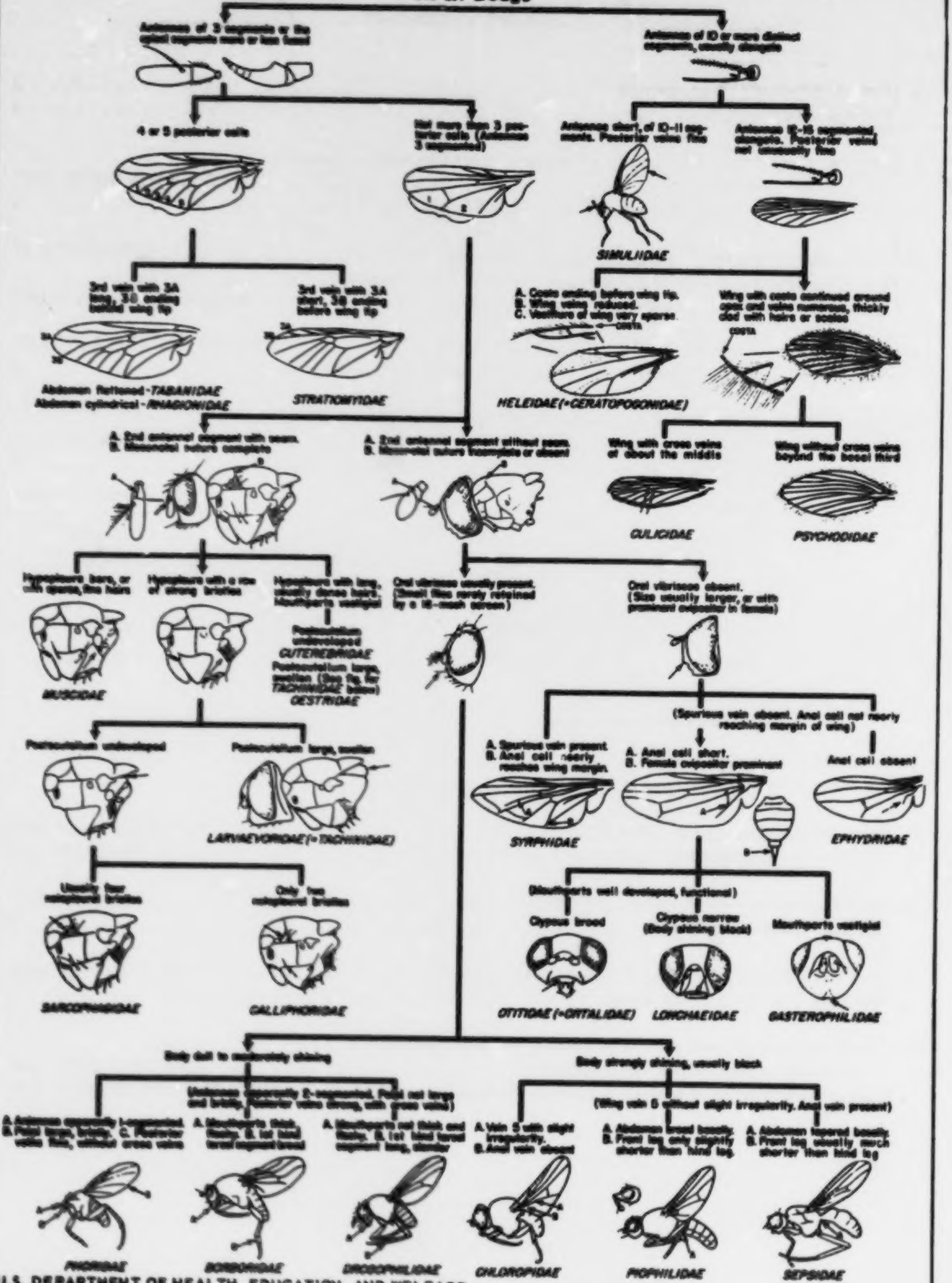
9. Mandibles strongly incurved *(Solenopsis geminata)* . . . . TROPICAL FIRE ANT
   Mandibles not strongly incurved 10

10. Dorsal surface of head with large coarse, scattered punctures *(Solenopsis saevissima var. richteri)* . . . . IMPORTED FIRE ANT
    Dorsal surface of head without punctures *(Solenopsis xyloni)* . . . . SOUTHERN FIRE ANT

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1963

DIPTERA: PICTORIAL KEY TO PRINCIPAL FAMILIES OF PUBLIC HEALTH IMPORTANCE

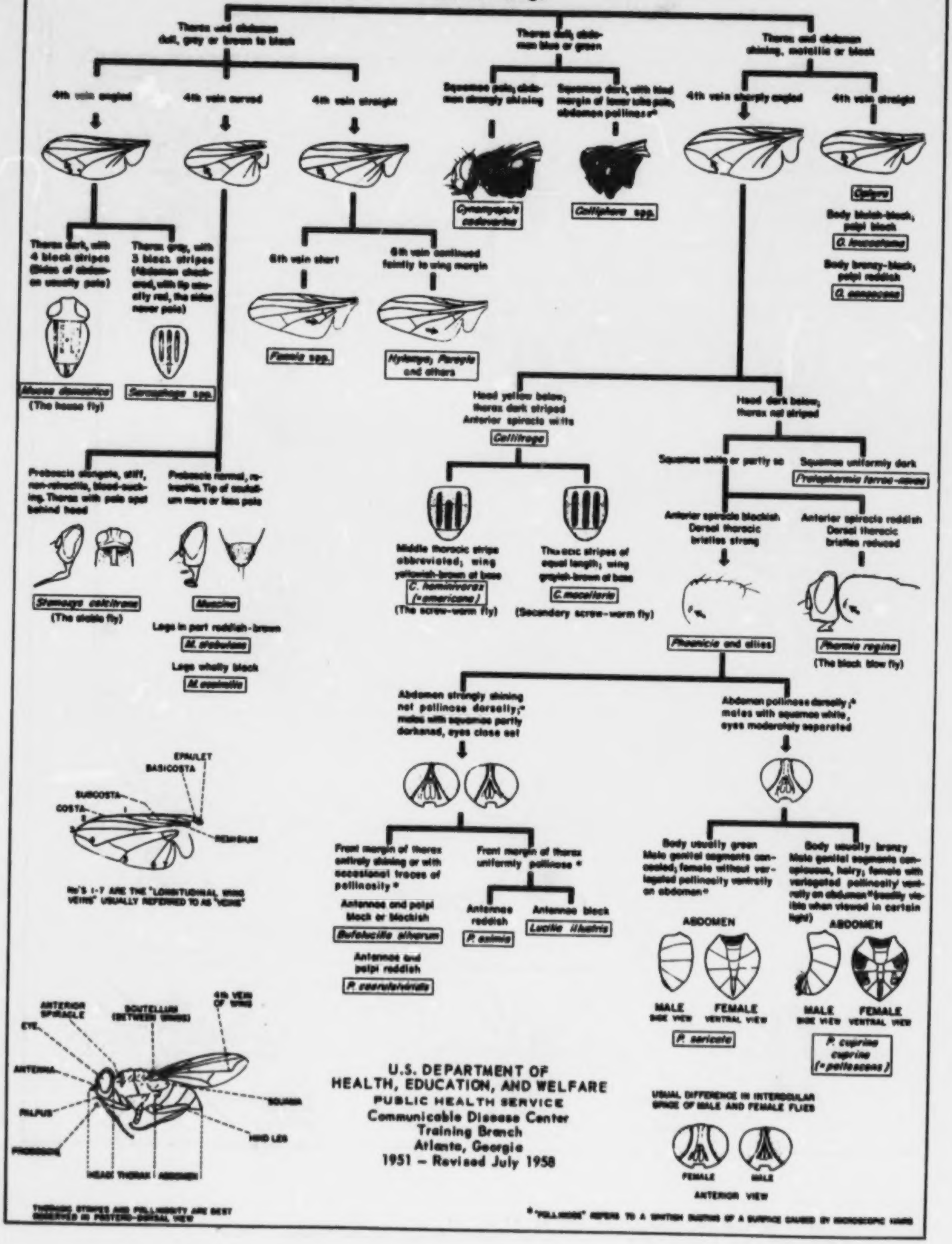
H. R. Dodge


Antennae of 3 segments or the apical segments more or less fused
Antennae of 10 or more distinct segments, usually elongate
4 or 5 posterior cells
Not more than 3 posterior cells (Antennae 3 segmented)
Antennae short, of 10-11 segments. Posterior veins fine
Antennae 12-15 segmented, elongate. Posterior veins not unusually fine
SIMULIIDAE
3rd vein with 3A long, 3B ending behind wing tip
3rd vein with 3A short, 3B ending before wing tip
3A
3B
Abdomen flattened - TABANIDAE
Abdomen cylindrical - RHAGIONIDAE
STRATIOMYIDAE
A. Costa ending before wing tip. B. Wing veins reduced. C. Venation of wing very sparse.
COSTA
Wing with costa continued around apex and veins numerous, thickly clad with hairs or scales
COSTA
HELEIDAE (=CERATOPOGONIDAE)
A. 2nd antennal segment with seam. B. Mesonotal suture complete
A. 2nd antennal segment without seam. B. Mesonotal suture incomplete or absent
Wing with cross veins at about the middle
Wing without cross veins beyond the basal third
CULICIDAE
PSYCHODIDAE
Hypopleura bare, or with sparse, fine hairs
Hypopleura with a row of strong bristles
Hypopleura with long, usually dense hairs. Mouthparts vestigial
Postscutellum undeveloped
CUTEREBRIDAE
Postscutellum large, swollen (See fig. for TACHINIDAE below)
OESTRIDAE
Oral vibrissae usually present. (Small flies rarely retained by a 16-mesh screen)
Oral vibrissae absent. (Size usually larger, or with prominent ovipositor in female)
MUSCIDAE
Postscutellum undeveloped
Postscutellum large, swollen
LARVAEVORIDAE (=TACHINIDAE)
(Spurious vein absent. Anal cell not nearly reaching margin of wing)
A. Spurious vein present. B. Anal cell nearly reaches wing margin.
A. Anal cell short. B. Female ovipositor prominent
Anal cell absent
SYRPHIDAE
EPHYDRIDAE
Usually four notopleural bristles
Only two notopleural bristles
(Mouthparts well developed, functional)
Clypeus broad
Clypeus narrow (Body shining black)
Mouthparts vestigial
SARCOPHAGIDAE
CALLIPHORIDAE
OTITIDAE (=ORTALIDAE)
LONCHAEIDAE
GASTEROPHILIDAE
Body dull to moderately shining
Body strongly shining, usually black
(Abdomen apparently 5-segmented. Palpi not large and bristly. Posterior veins strong, with cross veins)
(Wing vein 5 without slight irregularity. Anal vein present)
A. Abdomen apparently 6-segmented. B. Palpi large, bristly. C. Posterior veins fine, without cross veins
A. Mouthparts thick, fleshy. B. 1st hind tarsal segment broad
A. Mouthparts not thick and fleshy. B. 1st hind tarsal segment long, slender
A. Vein 5 with slight irregularity. B. Anal vein absent
A. Abdomen broad basally. B. Front leg only slightly shorter than hind leg.
A. Abdomen tapered basally. B. Front leg usually much shorter than hind leg
PHORIDAE
BORBORIDAE
DROSOPHILIDAE
CHLOROPIDAE
PIOPHILIDAE
SEPSIDAE

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1948, Revised May 1953

DOMESTIC FLIES: PICTORIAL KEY TO COMMON SPECIES IN THE U.S.

H. R. Dodge


Thorax and abdomen dull, grey or brown to black
4th vein angled
4th vein curved
4th vein straight
Thorax dark, with 4 black stripes (Sides of abdomen usually pale)
Thorax gray, with 3 black stripes (Abdomen checkered, with tip usually red, the sides never pale)
Musca domestica
(The house fly)
Sarcophaga spp.
6th vein short
6th vein continued faintly to wing margin
Fannia spp.
Hydrotaea, Ophyra and others
Proboscis elongate, stiff, non-retractile, blood-sucking. Thorax with pale spot behind head
Proboscis normal, retractile. Tip of scutellum more or less pale
Stomoxys calcitrans
(The stable fly)
Muscina
Legs in part reddish-brown
M. stabulans
Legs wholly black
M. assimilis
Thorax dull, abdomen blue or green
Squamae pale, abdomen strongly shining
Squamae dark, with hind margin of lower lobe pale, abdomen pollinose*
Cynomyopsis cadaverina
Calliphora spp.
Thorax and abdomen shining, metallic or black
4th vein sharply angled
4th vein straight
Ophyra
Body bluish-black, palpi black
O. leucostoma
Body bronzy-black, palpi reddish
O. aenescens
Head yellow below; thorax dark striped Anterior spiracle white
Callitroga
Middle thoracic stripe abbreviated; wing yellowish-brown at base
C. hominivorax (=americana)
(The screw-worm fly)
Thoracic stripes of equal length; wing grayish-brown at base
C. macellaria
(Secondary screw-worm fly)
Head dark below, thorax not striped
Squamae white or partly so
Squamae uniformly dark
Protophormia terrae-novae
Anterior spiracle blackish Dorsal thoracic bristles strong
Anterior spiracle reddish Dorsal thoracic bristles reduced
Phaenicia and allies
Phormia regina
(The black blow fly)
Abdomen strongly shining not pollinose dorsally;* males with squamae partly darkened, eyes close set
Abdomen pollinose dorsally;* males with squamae white, eyes moderately separated
Front margin of thorax entirely shining or with occasional traces of pollinosity*
Antennae and palpi black or blackish
Bufolucilia silvarum
Antennae and palpi reddish
P. caeruleiviridis
Front margin of thorax uniformly pollinose*
Antennae reddish
P. eximia
Antennae black
Lucilia illustris
Body usually green Male genital segments concealed; female without variegated pollinosity ventrally on abdomen*
Body usually bronzy Male genital segments conspicuous, hairy; female with variegated pollinosity ventrally on abdomen* (readily visible when viewed in certain light)
ABDOMEN
MALE SIDE VIEW
FEMALE VENTRAL VIEW
P. sericata
ABDOMEN
MALE SIDE VIEW
FEMALE VENTRAL VIEW
P. cuprina cuprina (=pallescens)
EPAULET
BASICOSTA
SUBCOSTA
COSTA
1
2
3
4
5
6
7
REMIGIUM
No'S 1-7 ARE THE "LONGITUDINAL WING VEINS" USUALLY REFERRED TO AS "VEINS"
ANTERIOR SPIRACLE
SCUTELLUM (BETWEEN WINGS)
4th VEIN OF WING
EYE
ANTENNA
PALPUS
PROBOSCIS
SQUAMA
HIND LEG
HEAD
THORAX
ABDOMEN
USUAL DIFFERENCE IN INTEROCULAR SPACE OF MALE AND FEMALE FLIES
FEMALE
MALE
ANTERIOR VIEW

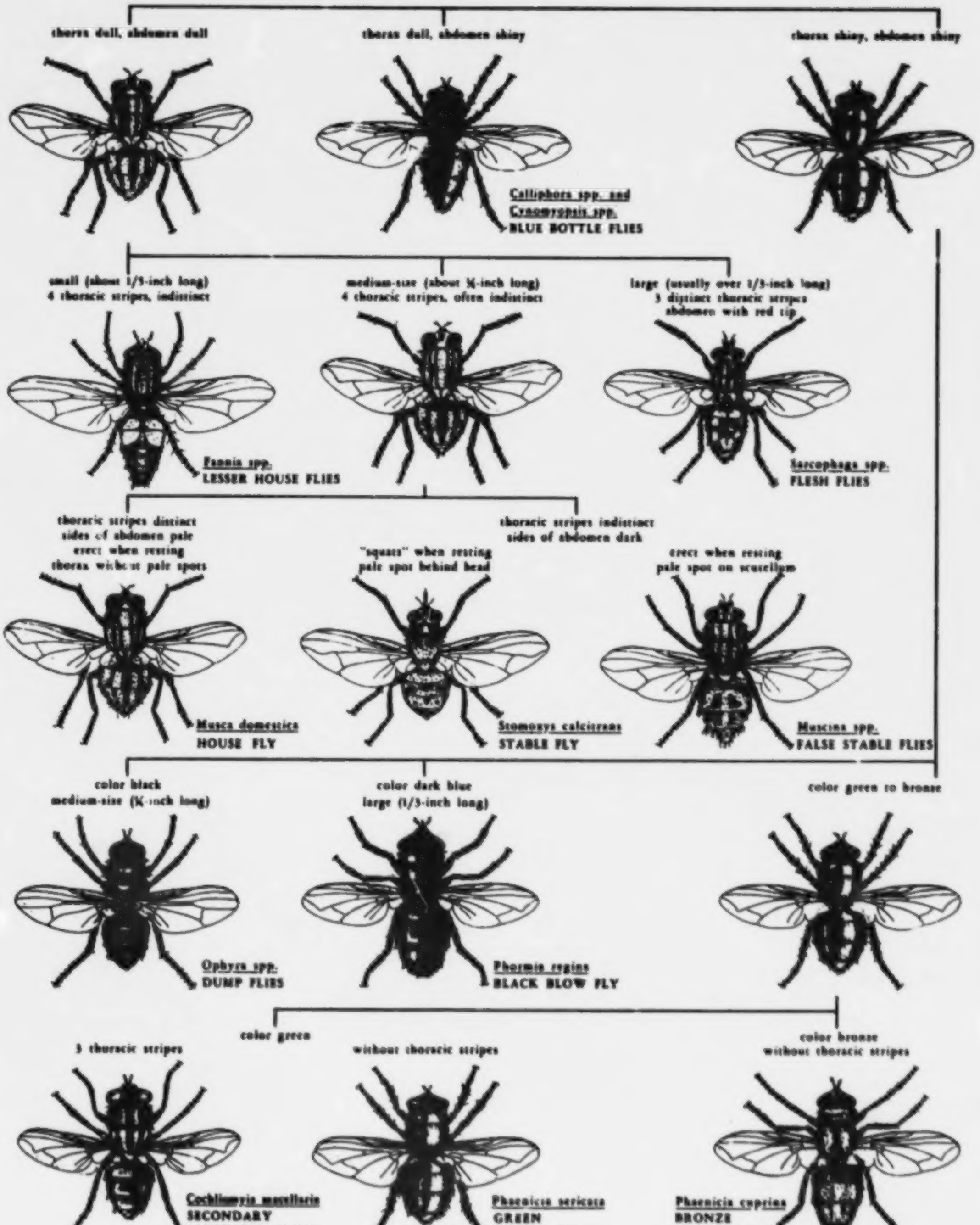
U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Communicable Disease Center
Training Branch
Atlanta, Georgia
1951 – Revised July 1958

THORACIC STRIPES AND POLLINOSITY ARE BEST OBSERVED IN POSTERO-DORSAL VIEW

* "POLLINOSE" REFERS TO A WHITISH DUSTING OF A SURFACE CAUSED BY MICROSCOPIC HAIRS

DOMESTIC FLIES: PICTORIAL KEY TO COMMON SPECIES

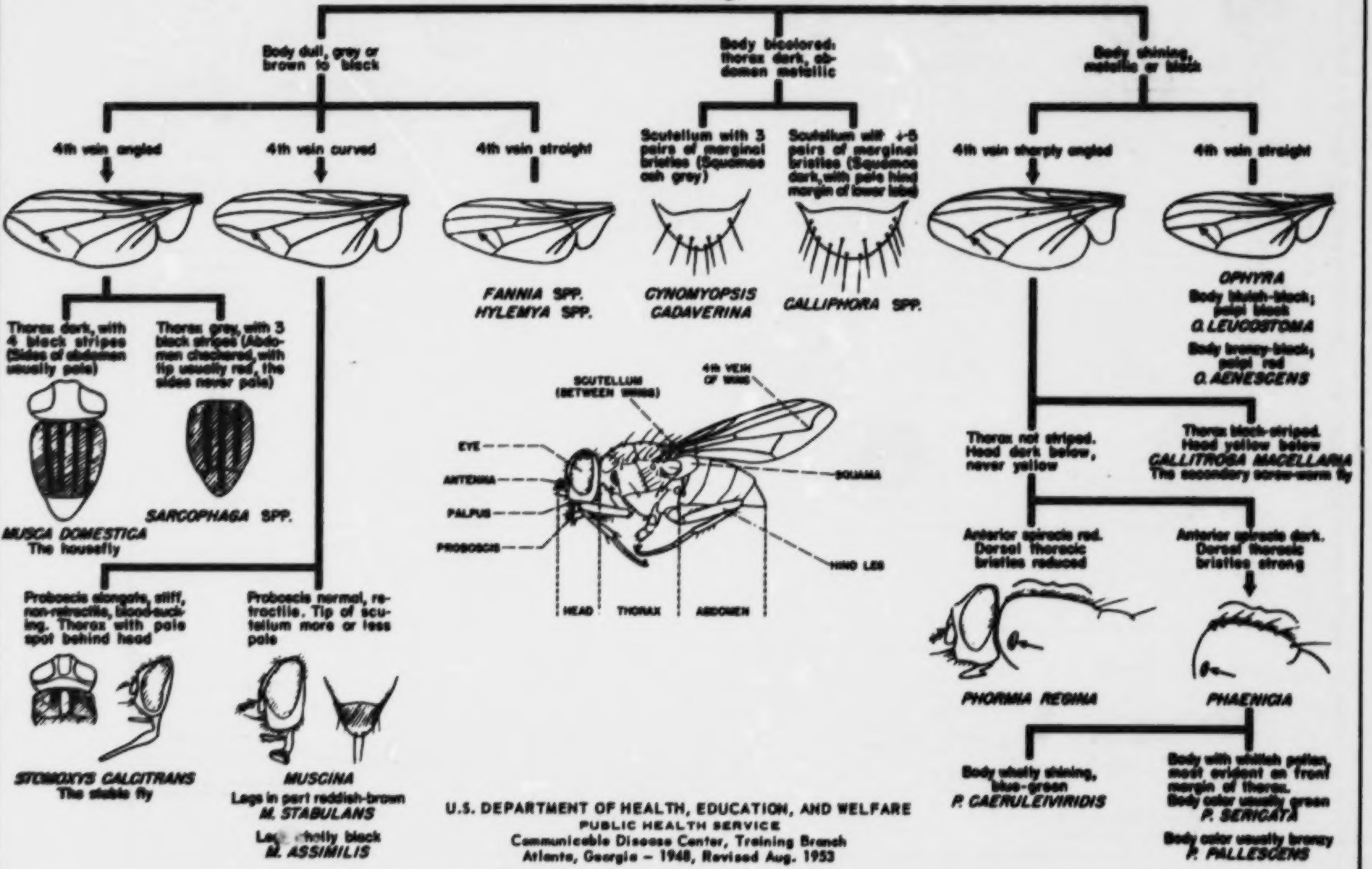
Harold George Scott and Margery R. Borom


thorax dull, abdomen dull
thorax dull, abdomen shiny
thorax shiny, abdomen shiny
Calliphora spp. and
Cynomyopsis spp.
BLUE BOTTLE FLIES
small (about 1/5-inch long)
4 thoracic stripes, indistinct
medium-size (about ¼-inch long)
4 thoracic stripes, often indistinct
large (usually over 1/3-inch long)
3 distinct thoracic stripes
abdomen with red tip
Fannia spp.
LESSER HOUSE FLIES
Sarcophaga spp.
FLESH FLIES
thoracic stripes distinct
sides of abdomen pale
erect when resting
thorax without pale spots
thoracic stripes indistinct
sides of abdomen dark
"squats" when resting
pale spot behind head
erect when resting
pale spot on scutellum
Musca domestica
HOUSE FLY
Stomoxys calcitrans
STABLE FLY
Muscina spp.
FALSE STABLE FLIES
color black
medium-size (¼-inch long)
color dark blue
large (1/3-inch long)
color green to bronze
Ophyra spp.
DUMP FLIES
Phormia regina
BLACK BLOW FLY
color green
3 thoracic stripes
without thoracic stripes
color bronze
without thoracic stripes
Cochliomyia macellaria
SECONDARY
SCREW WORM FLY
Phaenicia sericata
GREEN
BOTTLE FLY
Phaenicia cuprina
BRONZE
BOTTLE FLY

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

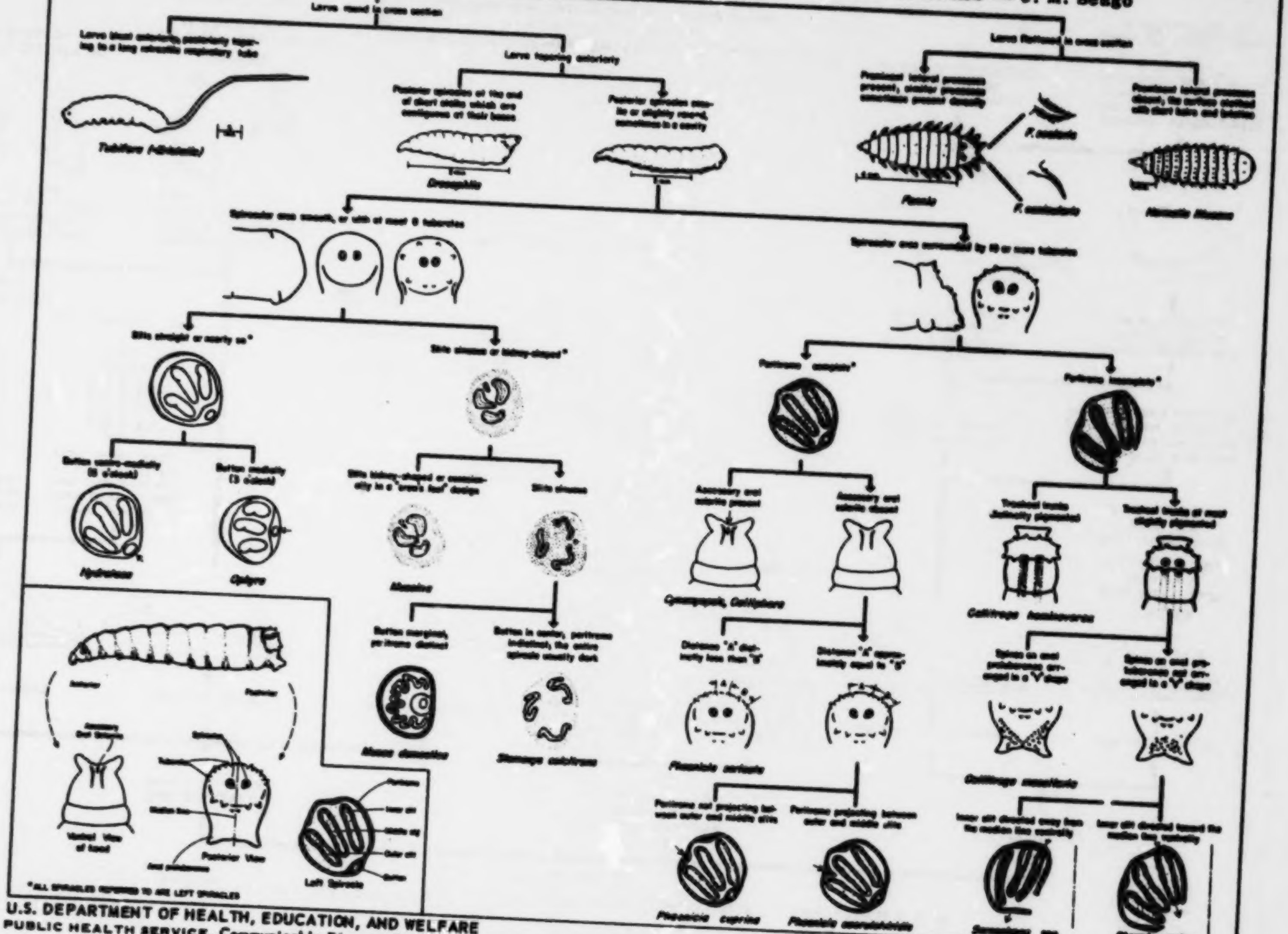
DOMESTIC FLIES: PICTORIAL KEY TO COMMON SPECIES IN SOUTHERN U.S.

H. R. Dodge


Body dull, grey or brown to black
Body bicolored: thorax dark, abdomen metallic
Body shining, metallic or black
4th vein angled
4th vein curved
4th vein straight
Scutellum with 3 pairs of marginal bristles (Squamae ash grey)
Scutellum with 4-5 pairs of marginal bristles (Squamae dark, with pale hind margin of lower lobe)
4th vein sharply angled
4th vein straight
FANNIA SPP.
HYLEMYA SPP.
CYNOMYOPSIS CADAVERINA
CALLIPHORA SPP.
OPHYRA
Body bluish-black; palpi black
O. LEUCOSTOMA
Body bronzy-black; palpi red
O. AENESCENS
Thorax dark, with 4 black stripes (Sides of abdomen usually pale)
Thorax grey, with 3 black stripes (Abdomen checkered, with tip usually red, the sides never pale)
MUSCA DOMESTICA
The housefly
SARCOPHAGA SPP.
SCUTELLUM (BETWEEN WINGS)
4th VEIN OF WING
EYE
ANTENNA
PALPUS
PROBOSCIS
SQUAMA
HIND LEG
HEAD
THORAX
ABDOMEN
Thorax not striped. Head dark below, never yellow
Thorax black-striped. Head yellow below
CALLITROGA MACELLARIA
The secondary screw-worm fly
Anterior spiracle red. Dorsal thoracic bristles reduced
Anterior spiracle dark. Dorsal thoracic bristles strong
PHORMIA REGINA
PHAENICIA
Proboscis elongate, stiff, non-retractile, blood-sucking. Thorax with pale spot behind head
Proboscis normal, retractile. Tip of scutellum more or less pale
STOMOXYS CALCITRANS
The stable fly
MUSCINA
Legs in part reddish-brown
M. STABULANS
Legs wholly black
M. ASSIMILIS
Body usually shining, blue-green
P. CAERULEIVIRIDIS
Body with whitish pollen, most evident on front margin of thorax. Body color usually green
P. SERICATA
Body color usually bronzy
P. PALLESCENS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Communicable Disease Center, Training Branch
Atlanta, Georgia – 1948, Revised Aug. 1953

FLY LARVAE: PICTORIAL KEY TO SOME COMMON SPECIES — J. M. Seago



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1952 – Revised 1953

FLY LARVAE: KEY TO SOME SPECIES OF PUBLIC HEALTH IMPORTANCE

Chester J. Stojanovich – Harry D. Pratt – Elwin E. Bennington

1. Larva with a definite, hard, sclerotized head capsule (Fig. 1 A)..........................2

Larva without a definite, hard, sclerotized head capsule (Fig. 1 B)......................3

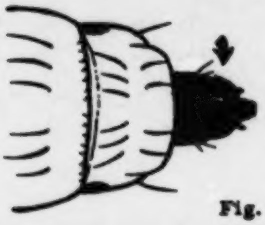


Fig. 1 A

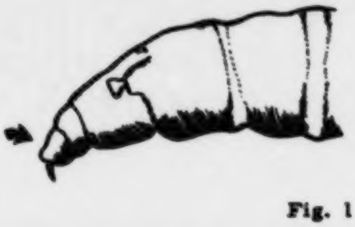


Fig. 1 B

2. Body flattened; large larvae 12-20 mm. long (Fig. 2 A)... (Hermetia illucens) SOLDIER FLY

Body cylindrical with spiracles opening in a tubular segment at posterior end of body, last segment modified into a sclerotized air tube (Fig. 2 B)...(Genus Psychoda & allies) FILTER FLIES

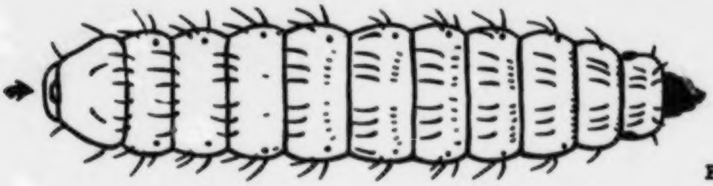


Fig. 2 A

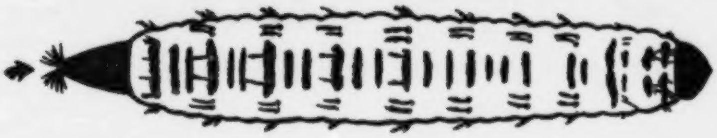


Fig. 2 B

3. Body with spine-like dorsal and lateral processes on each segment; posterior spiracles on small elevations (Fig. 3 A)...(Genus Fannia)...4

Body smooth, or with short spines, but no long lateral processes (Fig. 3 B)............... 5

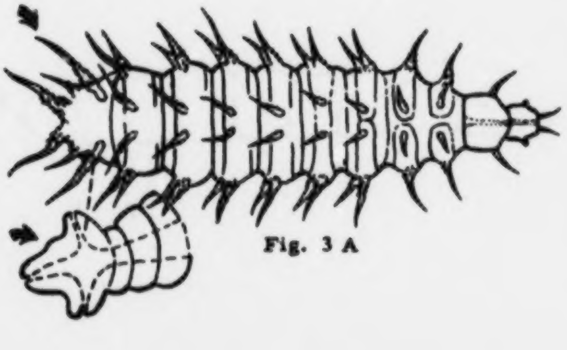


Fig. 3 A

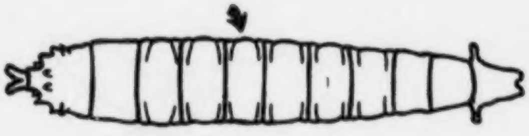


Fig. 3 B

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

4. Processes branched or feathery (Fig. 4 A)................(*Fannia scalaris*) LATRINE FLY

Processes without branches, spiny (Fig. 4 B)..(*Fannia canicularis*) LESSER HOUSE FLY

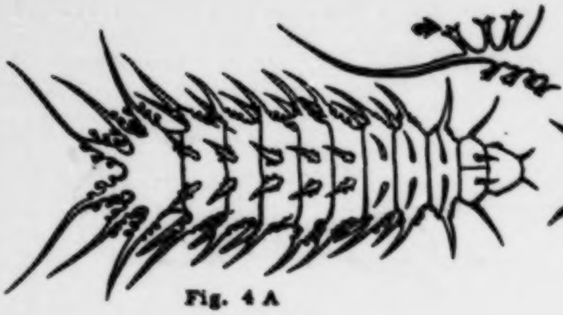


Fig. 4 A

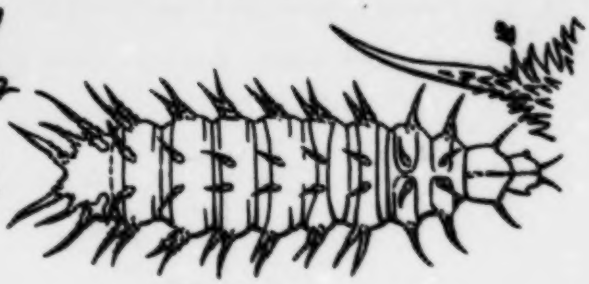


Fig. 4 B

5.. Posterior spiracles on peg-like tubercles or cones; smaller larvae, usually 6-9 mm. long (Fig. 5 A).. 6

Posterior spiracles not on peg-like tubercles; larger larvae, usually 9-18 mm. long (Fig. 5 B).. 7

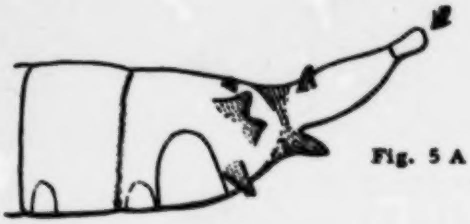


Fig. 5 A

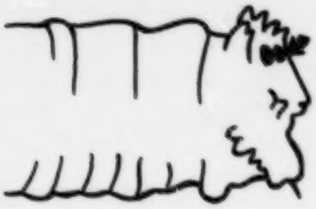


Fig. 5 B

6. Posterior spiracles at ends of long tubercles (Fig. 6 A)... (Genus *Drosophila*) VINEGAR FLIES

Posterior spiracles on short cones, last segment with short finger-like lateral process (Fig. 6 B)..(*Piophila casei*) CHEESE SKIPPER

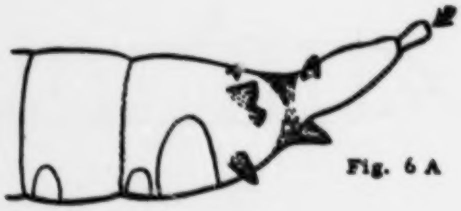


Fig. 6 A

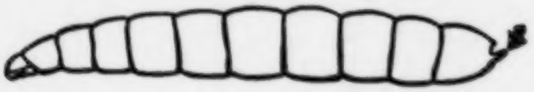


Fig. 6 B

7. Posterior end of body extended to form a tail (Fig. 7 A)....................................
....(*Eristalis tenax*) RAT-TAILED MAGGOT

Body swollen or tapered posteriorly, but never extended into a tail like process (Fig. 7 B)..8

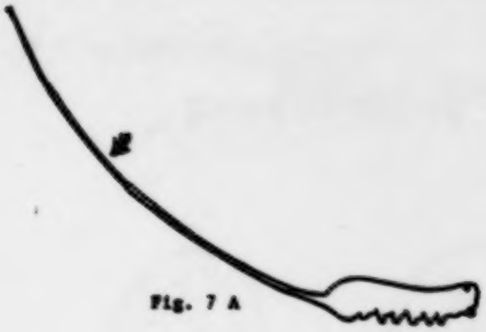


Fig. 7 A

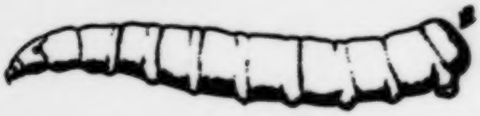


Fig. 7 B

8. Peritreme present, with 3 distinct slits (Fig. 8 A).......................................9

Peritreme absent; or if present without 3 distinct slits (Fig. 8 B & C)....................23

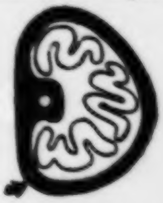


Fig. 8 A

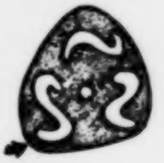


Fig. 8 B

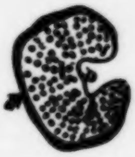


Fig. 8 C

9. Slits of posterior spiracles straight (Fig. 9 A)..10

Slits of posterior spiracles strongly sinuous (Fig. 9 B)....................................22

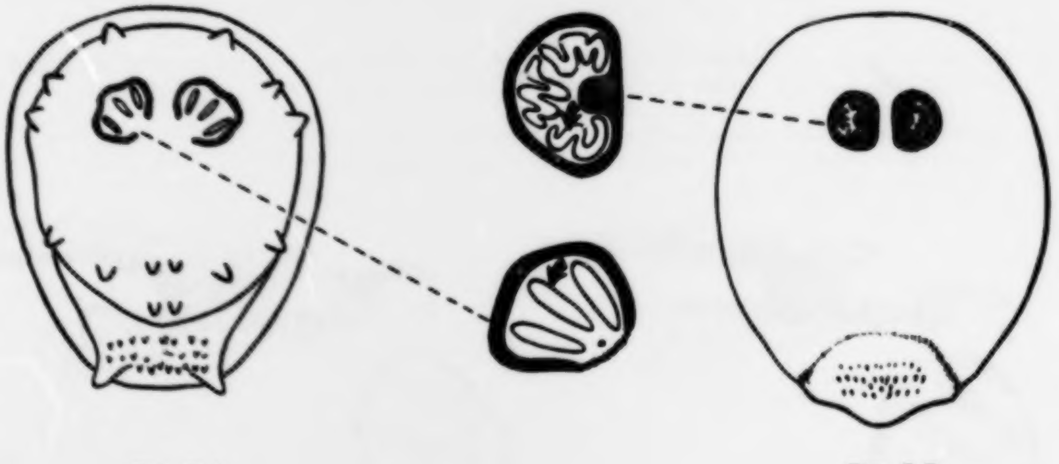


Fig. 9 A

Fig. 9 B

10. Dorsal and ventral arms of cephaloskeleton almost equal (Fig. 10 A); peritreme with two non-sclerotized areas away from the button (Fig. 10 B). . (Genus Ophyra) DUMP FLY

Dorsal arm of cephaloskeleton longer than ventral arm (Fig. 10 C); peritreme complete or with one weakly sclerotized area (Fig. 10 D & E).. 11

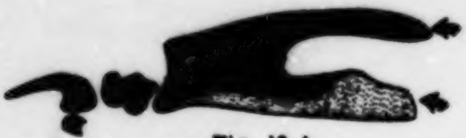


Fig. 10 A

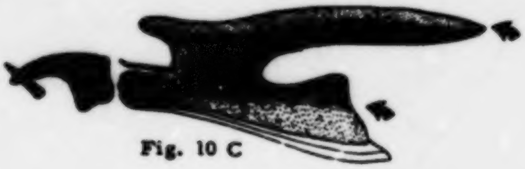


Fig. 10 C

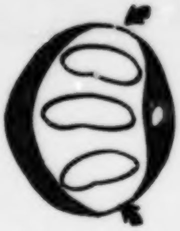
Fig. 10 B


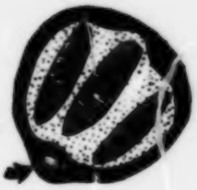
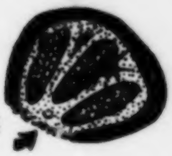
Fig. 10 D


Fig. 10 E


11. Posterior spiracles with peritreme complete, sometimes weak in area of button (Fig. 11 A) 12

Posterior spiracles with peritreme incomplete, not enclosing a sometimes ill-defined button (Fig. 11 B).. 16

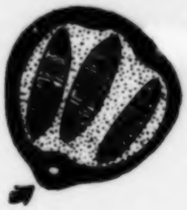


Fig. 11 A

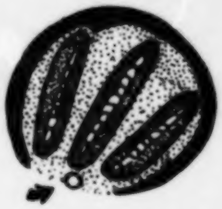


Fig. 11 B

12. Spiracular plate and button heavily sclerotized; accessory oral sclerite present (Fig. 12 A & B).. 13

Spiracular plate and button not heavily sclerotized; accessory oral sclerite absent (Fig. 12 C & D).. 14

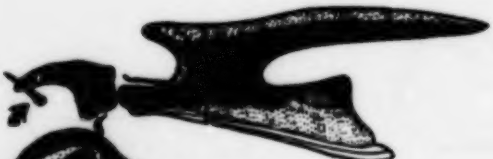


Fig. 12 A

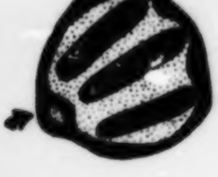


Fig. 12 B

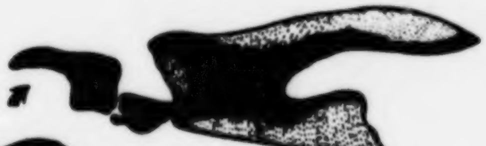


Fig. 12 C

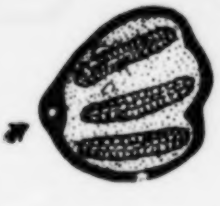


Fig. 12 D

13. Mandibular sclerite with tooth longer than greatest width of basal portion (Fig. 13 A)..... .... (*Calliphora vicina*) A BLUE BOTTLE FLY

Mandibular sclerite with tooth only as long as greatest width of basal portion (Fig. 13 B).. ....(*Cynomyopsis cadaverina*) A BLUE BOTTLE FLY

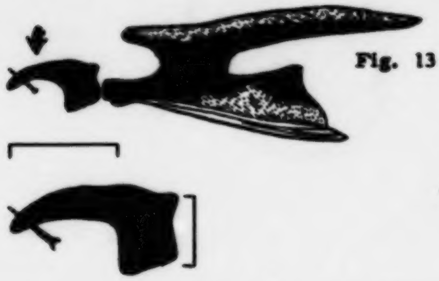


Fig. 13 A

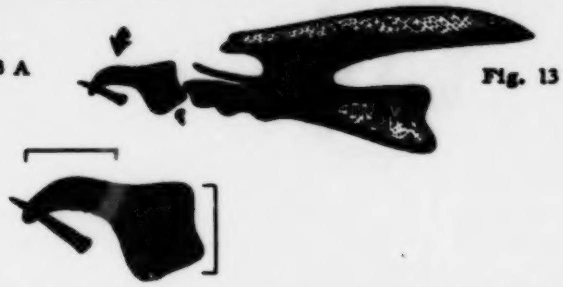


Fig. 13 B

14. Peritreme thick with rounded or sharp projections which extend inward toward spiracular slits (Fig. 14 A); cephaloskeleton as in figure 14 B.. ....(*Phaenicia caeruleiviridis*) A GREEN BOTTLE FLY

Peritreme thin, usually with no projections or if present only slightly sclerotized (Fig. 14 C)..15

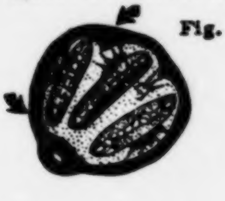


Fig. 14 A

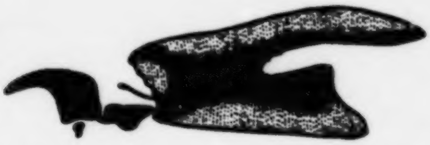


Fig. 14 B

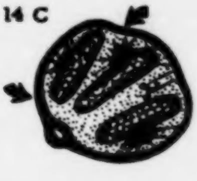


Fig. 14 C

15. At least one of the prothoracic spiracles with 8 or more openings (Fig. 15 A); peritreme and cephaloskeleton as in figures 15 B & C. . (*Phaenicia sericata*) A GREEN BOTTLE FLY

At least one of the prothoracic spiracles with 6 or less openings (Fig. 15 D); peritreme and cephaloskeleton as in figures 15 E & F.. (Syn. *P. pallescens*)......................(*Phaenicia cuprina*)A BRONZE BOTTLE FLY

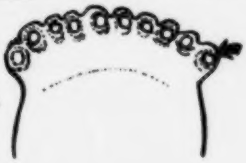


Fig. 15 A

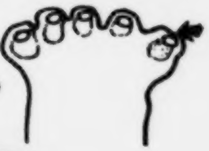


Fig. 15 D

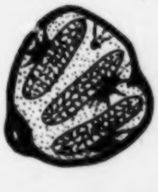


Fig. 15 B

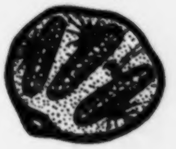


Fig. 15 E

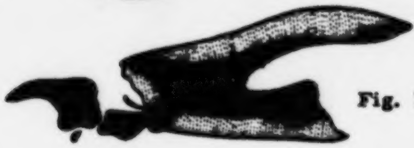


Fig. 15 C

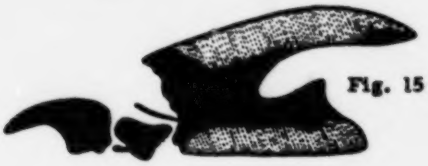


Fig. 15 F

16. Spiracular slits not pointing toward opening in peritreme (Fig. 16 A)....................17

Spiracular slits pointing toward opening in peritreme (Fig. 16 B)........................18

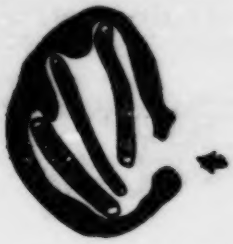


Fig. 16 A

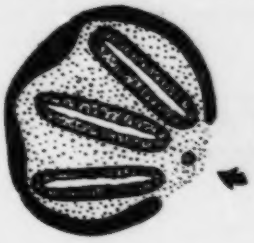


Fig. 16 B

17. Very large size, about 20 mm. long; mandibular sclerite as in figure 17 A.................
..................................(Sarcophaga clitellivora or S. bullata) A FLESH FLY

Smaller size, about 10 mm. long; mandibular sclerite as in figure 17 B....................
.... (Sarcophaga haemorrhoidalis) A FLESH FLY

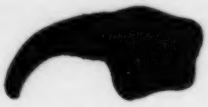


Fig. 17 A

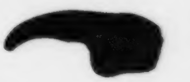


Fig. 17 B

18. At least one of the prothoracic spiracles with 9 or less openings (Fig. 18 A)..............19

At least one of the prothoracic spiracles with 10 or more openings (Fig. 18 B)............20

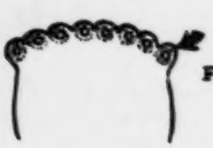


Fig. 18 A

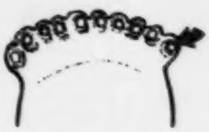


Fig. 18 B

19. Mandibular sclerite with tooth longer than width of basal portion (Fig. 19 A)..............
....(Wohlfahrtia opaca) A FLESH FLY

Mandibular sclerite with tooth only as long as greatest width of basal portion (Fig. 19 B)..
.... (Wohlfahrtia vigil) A FLESH FLY

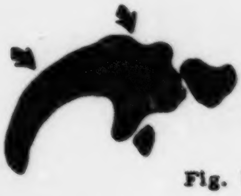


Fig. 19 A

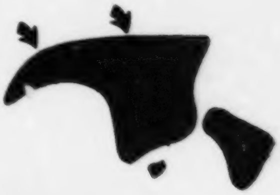


Fig. 19 B

20. Button indistinct or absent; walls of slits with lateral swellings (Fig. 20 A)..............21

Button present; walls of slits without lateral swellings (Fig. 20 B)........................
....(Phormia regina) BLACK BLOW FLY

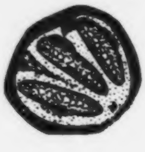


Fig. 20 A

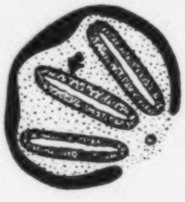


Fig. 20 B

21. Tracheal trunks pigmented (Fig. 21 A)..
..................................(Cochliomyia hominivorax) PRIMARY SCREW-WORM

Tracheal trunks not pigmented (Fig. 21 B)..
..............................(Cochliomyia macellaria) SECONDARY SCREW-WORM

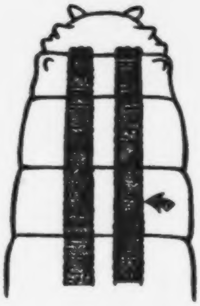


Fig. 21 A

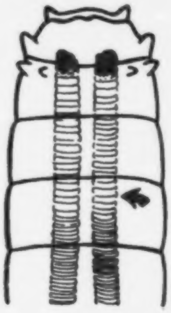


Fig. 21 B

22. Peritreme thick (Fig. 22 A)..............................(Musca domestica) HOUSE FLY

Peritreme thin (Fig. 22 B)..........................(Haematobia irritans) HORN FLY

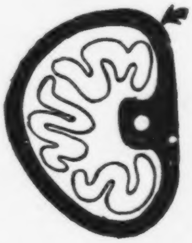


Fig. 22 A

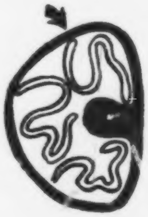


Fig. 22 B

23. Small or slender, round larvae, usually less than 13 mm. long, tapering anteriorly (Fig. 23 A).. 24

Large, robust larvae, over 15 mm long, with very stout spines (Fig. 23 B).............. 26

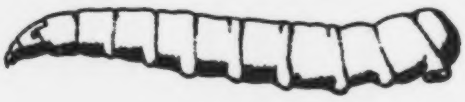


Fig. 23 A

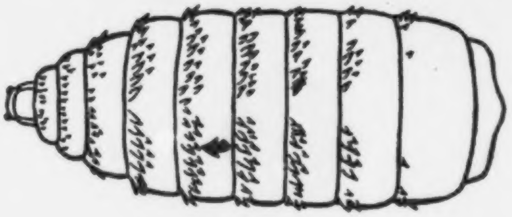


Fig. 23 B

24. Button centrally located (Fig. 24 A).................. (*Stomoxys calcitrans*) STABLE FLY

Button not centrally located (Fig. 24 B)... 25

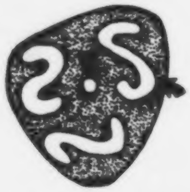


Fig. 24 A

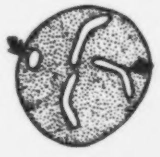


Fig. 24 B

25. Slits of posterior spiracles strongly sinuous (Fig. 25 A).... (*Musca autumnalis*) FACE FLY

**Slits of posterior spiracles not strongly sinuous (Fig. 25 B)..............................
....(Genus *Mucina*) FALSE STABLE FLY**

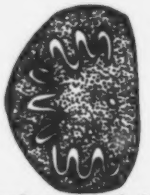


Fig. 25 A

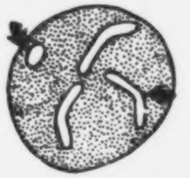


Fig. 25 B

26. Posterior spiracles with 3 distinct slits (Fig. 26 A)............................... 27

Posterior spiracles without 3 distinct slits (Fig. 26 B).............................. 28

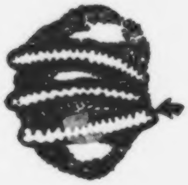


Fig. 26 A

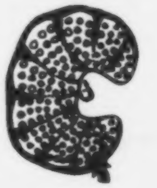


Fig. 26 B

27. Spiracular slits straight and sunken in deep cavity (Fig. 27 A); body shape as in figure 27 B. ....(Genus *Dermatobia*) HUMAN BOT FLY

Spiracular slits curved and at most in shallow cavity (Fig. 27 C); body shape as in figure 27 D...(Genus *Gasterophilus*) HORSE BOT FLY

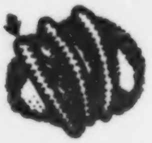


Fig. 27 A

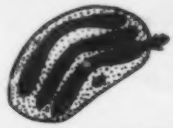


Fig. 27 C

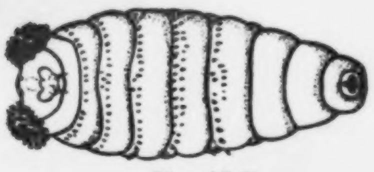


Fig. 27 B

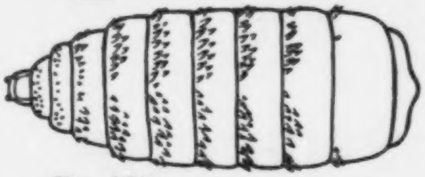


Fig. 27 D

28. Each spiracle divided into several plates (Fig. 28 A)... .... (Genus *Cuterebra*) RABBIT AND RODENT BOT FLY

Each spiracle not divided into several plates (Fig. 28 B)...............................29

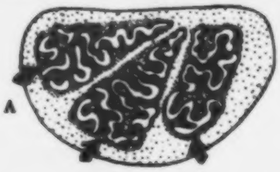


Fig. 28 A

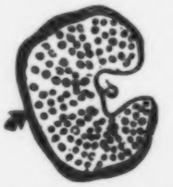


Fig. 28 B

29. Button centrally located (Fig. 29 A).......................(*Oestrus ovis*) SHEEP BOT FLY

Button not centrally located (Fig. 29 B)..30

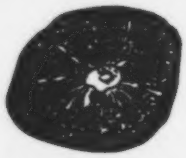


Fig. 29 A

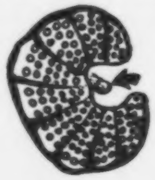


Fig. 29 B

30. Opening toward button narrow (Fig. 30 A)....(*Hypoderma bovis*) NORTHERN CATTLE GRUB

Opening toward button wide (Fig. 30 B)................(*Hypoderma lineatum*) CATTLE GRUB

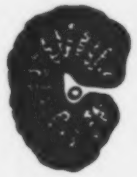


Fig. 30 A

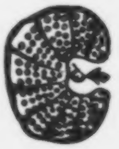
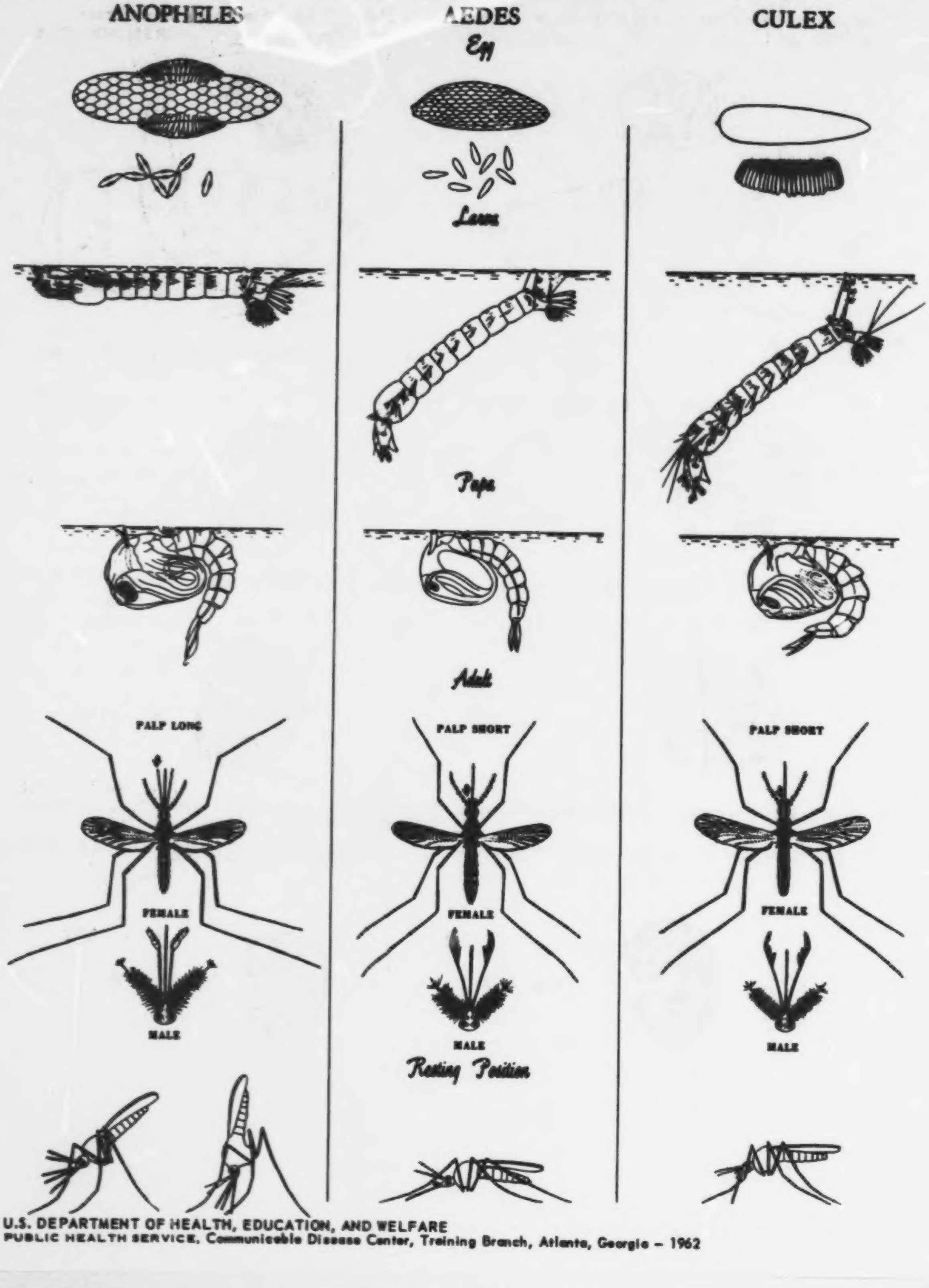


Fig. 30 B

MOSQUITOES: CHARACTERISTICS OF ANOPHELINES AND CULICINES

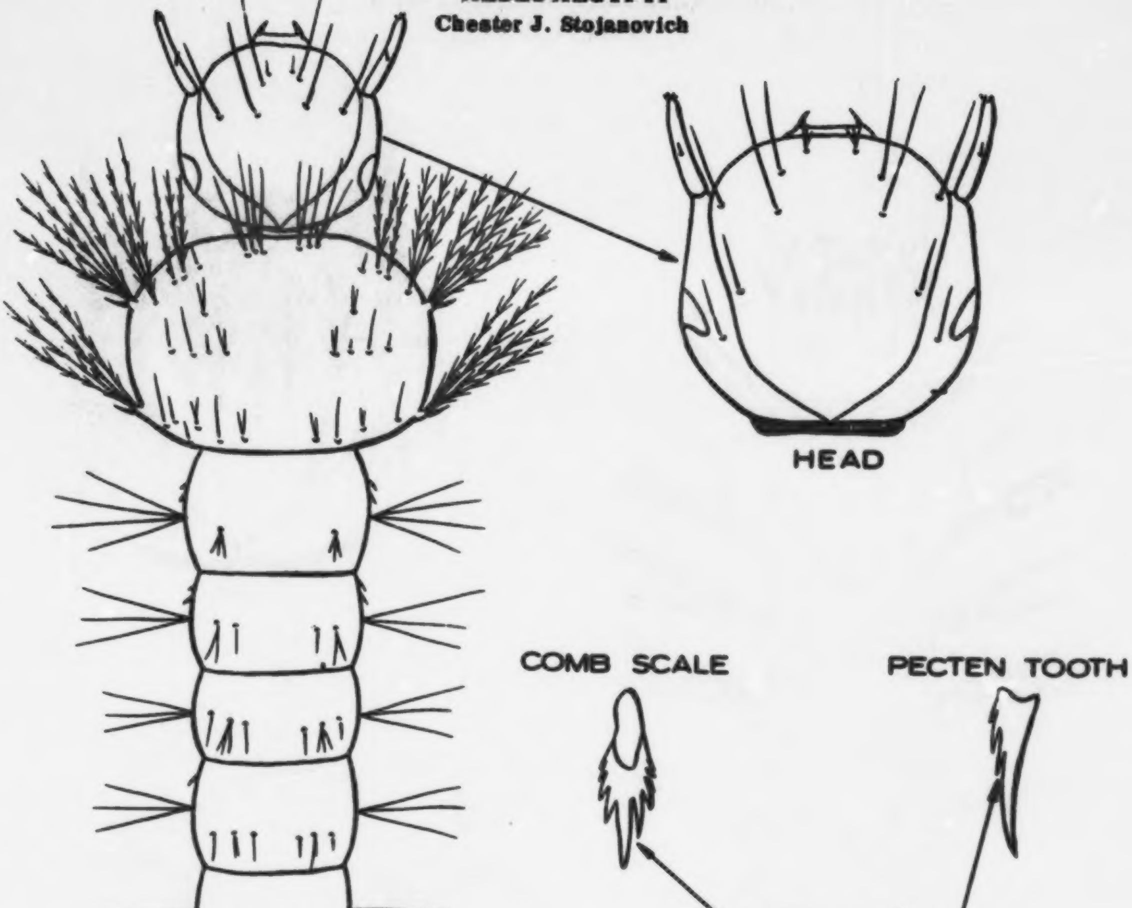
Kent S. Littig and Chester J. Stojanovich


ANOPHELES
AEDES
CULEX
Egg
Larva
Pupa
Adult
PALP LONG
PALP SHORT
PALP SHORT
FEMALE
FEMALE
FEMALE
MALE
MALE
MALE
Resting Position

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

AEDES AEGYPTI

Chester J. Stojanovich

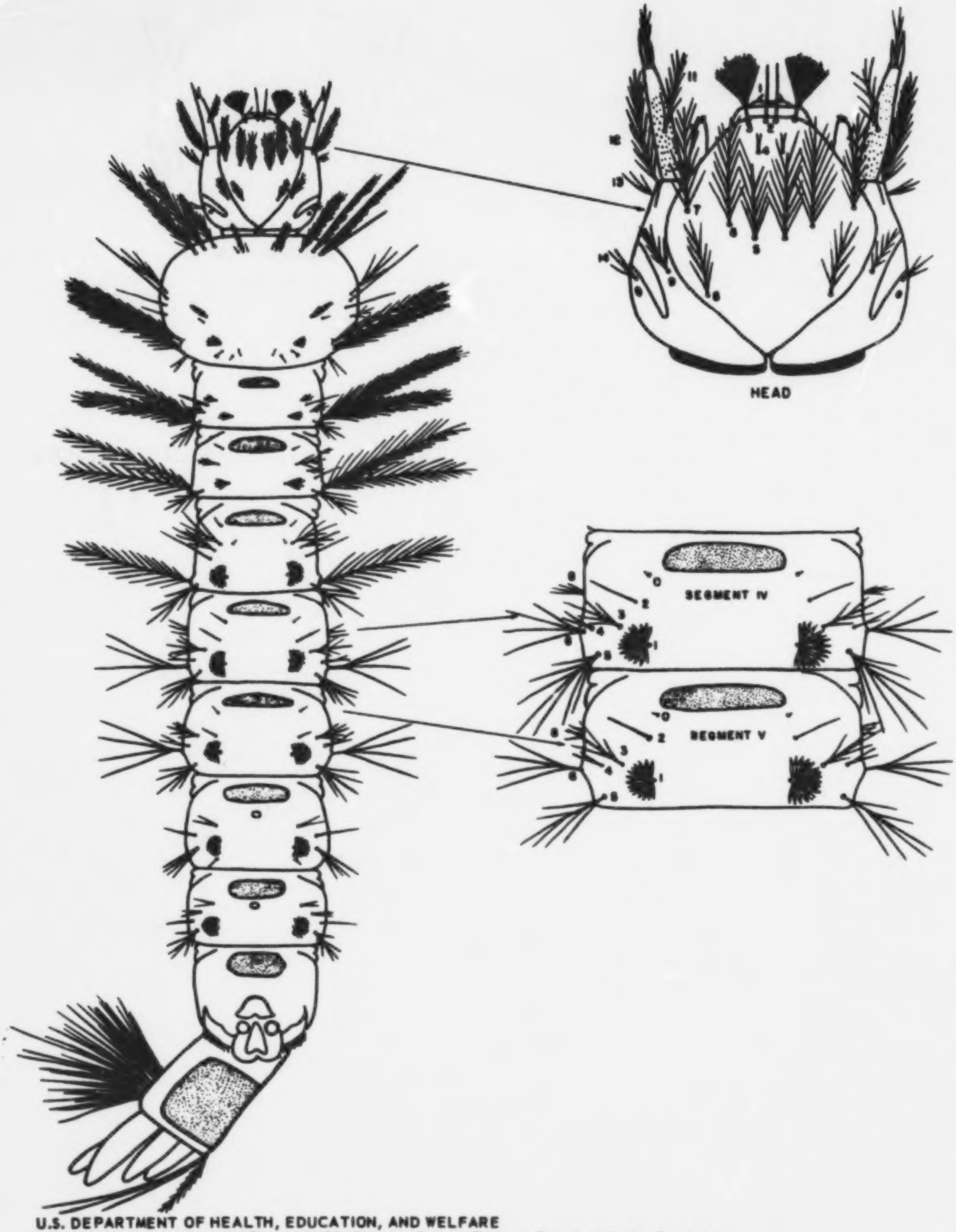

HEAD
COMB SCALE
PECTEN TOOTH
COMB
AIR TUBE
PECTEN
ANAL GILLS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1965

●136

ANOPHELES QUADRIMACULATUS

Harry D. Pratt


11
16
13
7
6
5
14
8
HEAD
6
0
2
SEGMENT IV
3
4
6
5
1
6
0
2
SEGMENT V
3
6
4
1
8

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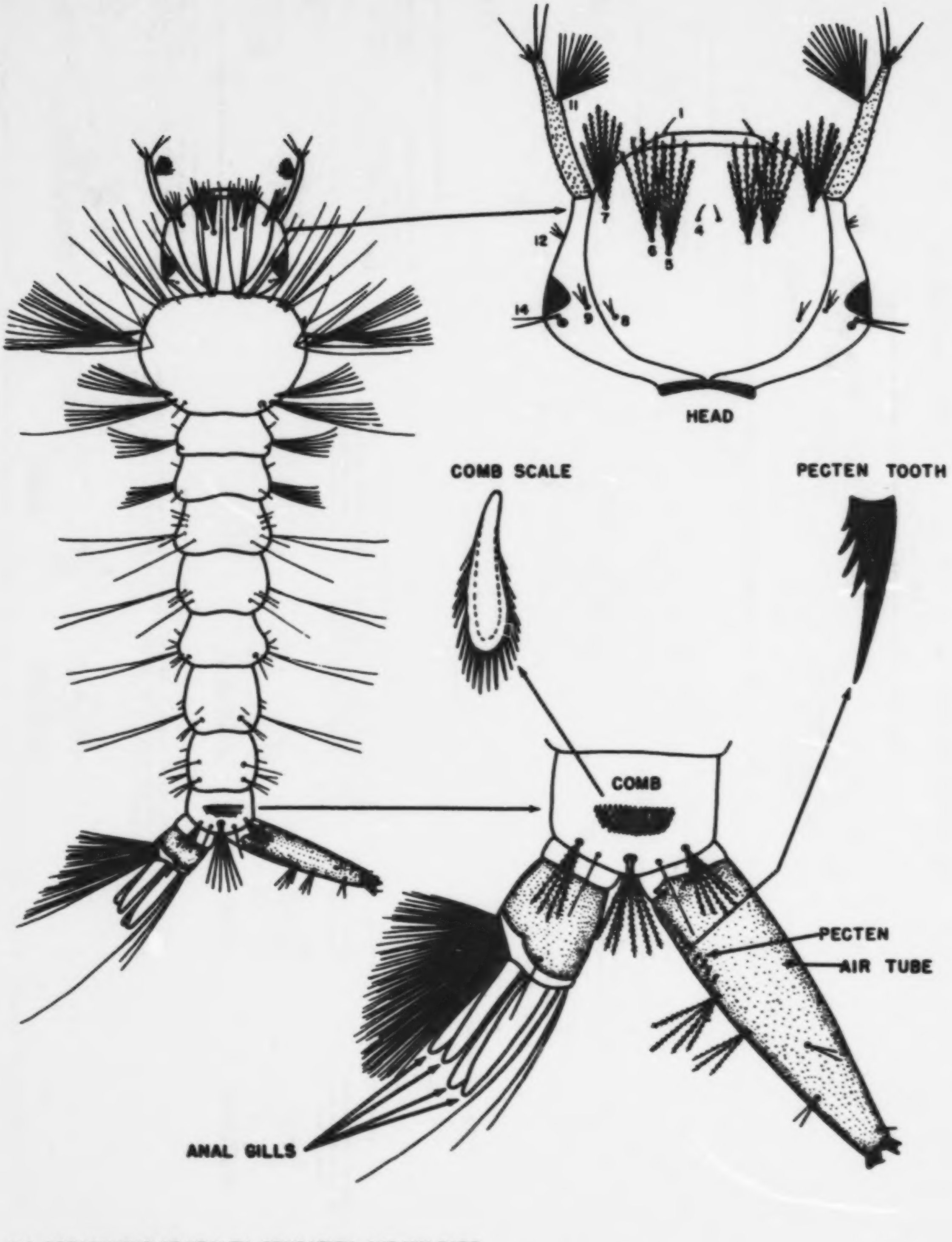
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia

CULEX QUINQUEFASCIATUS

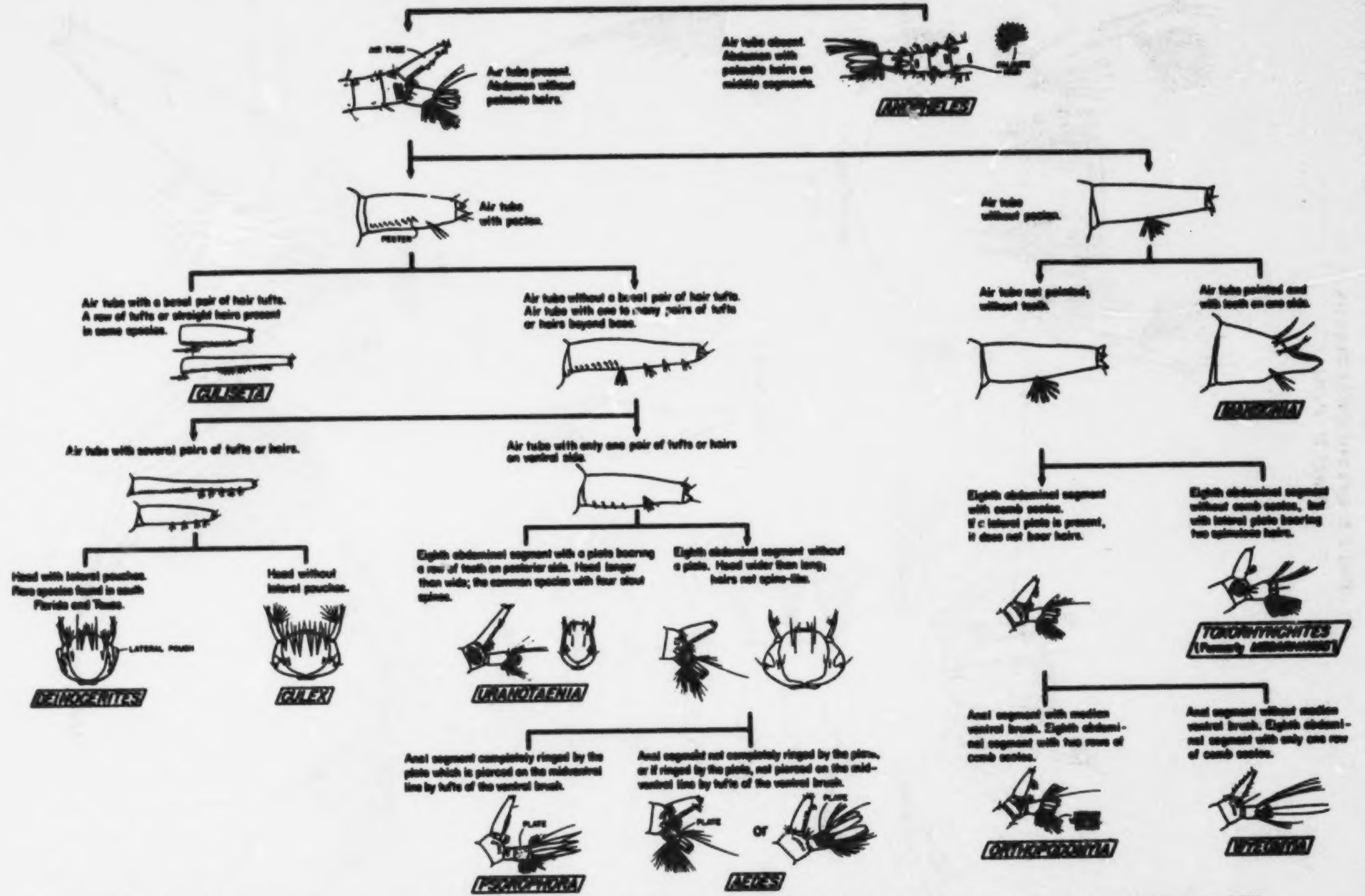
Harry D. Pratt


11
1
7
12
6
5
4
14
9
8
HEAD
COMB SCALE
PECTEN TOOTH
COMB
PECTEN
AIR TUBE
ANAL GILLS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia

MOSQUITOES: PICTORIAL KEY TO U.S. GENERA OF LARVAE

Harry D. Pratt

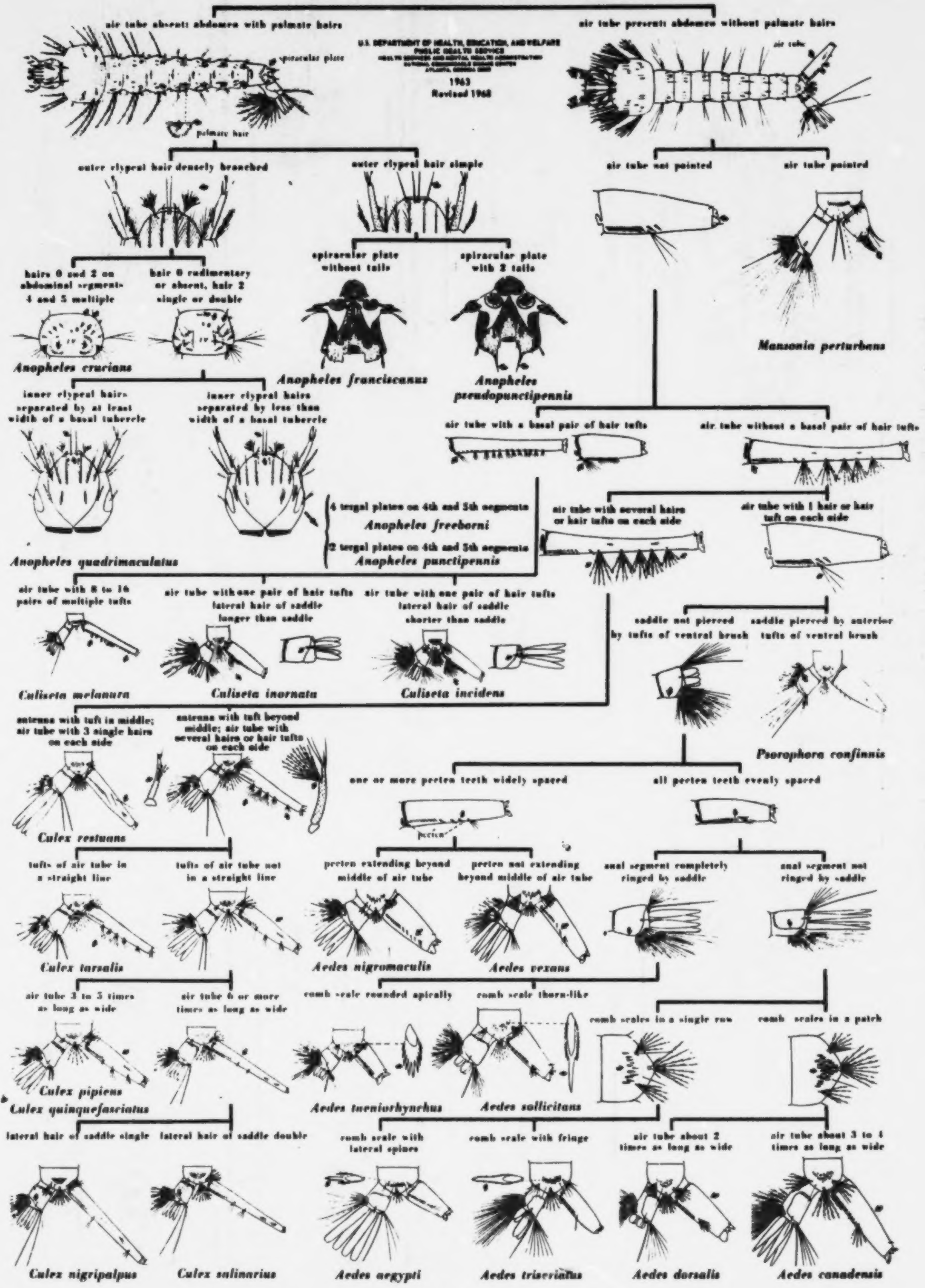

AIR TUBE
Air tube present. Abdomen without palmate hairs.
Air tube absent. Abdomen with palmate hairs on middle segments.
PALMATE HAIR
ANOPHELES
Air tube with pecten.
PECTEN
Air tube without pecten.
Air tube with a basal pair of hair tufts. A row of tufts or straight hairs present in some species.
CULISETA
Air tube without a basal pair of hair tufts. Air tube with one to many pairs of tufts or hairs beyond base.
Air tube with several pairs of tufts or hairs.
Air tube with only one pair of tufts or hairs on ventral side.
Head with lateral pouches. Rare species found in south Florida and Texas.
LATERAL POUCH
DEINOCERITES
Head without lateral pouches.
CULEX
Eighth abdominal segment with a plate bearing a row of teeth on posterior side. Head longer than wide; the common species with four stout spines.
URANOTAENIA
Eighth abdominal segment without a plate. Head wider than long; hairs not spine-like.
Anal segment completely ringed by the plate which is pierced on the midventral line by tufts of the ventral brush.
PLATE
PSOROPHORA
Anal segment not completely ringed by the plate, or if ringed by the plate, not pierced on the mid-ventral line by tufts of the ventral brush.
PLATE
or
PLATE
AEDES
Air tube not pointed, without teeth.
Air tube pointed and with teeth on one side.
MANSONIA
Eighth abdominal segment with comb scales. If a lateral plate is present, it does not bear hairs.
Eighth abdominal segment without comb scales, but with lateral plate bearing two spineless hairs.
TOXORHYNCHITES
(Formerly MEGARHINUS)
Anal segment with median ventral brush. Eighth abdominal segment with two rows of comb scales.
ORTHOPODOMYIA
Anal segment without median ventral brush. Eighth abdominal segment with only one row of comb scales.
WYEOMYIA

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1959

MOSQUITOES: PICTORIAL KEY TO SOME COMMON LARVAE OF THE UNITED STATES

Chester J. Stojanovich and Harry D. Pratt

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
HEALTH SERVICES AND MENTAL HEALTH ADMINISTRATION
NATIONAL COMMUNICABLE DISEASE CENTER
ATLANTA, GEORGIA 30333
1963
Revised 1968



air tube absent: abdomen with palmate hairs
spiracular plate
palmate hair
air tube present: abdomen without palmate hairs
air tube

outer clypeal hair densely branched
outer clypeal hair simple
air tube not pointed
air tube pointed

hairs 0 and 2 on abdominal segments 4 and 5 multiple
hair 0 rudimentary or absent, hair 2 single or double
Anopheles crucians

spiracular plate without tails
Anopheles franciscanus

spiracular plate with 2 tails
Anopheles pseudopunctipennis

Mansonia perturbans

inner clypeal hairs separated by at least width of a basal tubercle
Anopheles quadrimaculatus

inner clypeal hairs separated by less than width of a basal tubercle

4 tergal plates on 4th and 5th segments
Anopheles freeborni

2 tergal plates on 4th and 5th segments
Anopheles punctipennis

air tube with a basal pair of hair tufts
air tube without a basal pair of hair tufts

air tube with several hairs or hair tufts on each side
air tube with 1 hair or hair tuft on each side

air tube with 8 to 16 pairs of multiple tufts
Culiseta melanura

air tube with one pair of hair tufts lateral hair of saddle longer than saddle
Culiseta inornata

air tube with one pair of hair tufts lateral hair of saddle shorter than saddle
Culiseta incidens

saddle not pierced by tufts of ventral brush
saddle pierced by anterior tufts of ventral brush
Psorophora confinnis

antenna with tuft in middle; air tube with 3 single hairs on each side
Culex restuans

antenna with tuft beyond middle; air tube with several hairs or hair tufts on each side

one or more pecten teeth widely spaced
pecten
all pecten teeth evenly spaced

tufts of air tube in a straight line
Culex tarsalis

tufts of air tube not in a straight line

pecten extending beyond middle of air tube
Aedes nigromaculis

pecten not extending beyond middle of air tube
Aedes vexans

anal segment completely ringed by saddle
anal segment not ringed by saddle

air tube 3 to 5 times as long as wide
Culex pipiens
Culex quinquefasciatus

air tube 6 or more times as long as wide

comb scale rounded apically
Aedes taeniorhynchus

comb scale thorn-like
Aedes sollicitans

comb scales in a single row
comb scales in a patch

lateral hair of saddle single
Culex nigripalpus

lateral hair of saddle double
Culex salinarius

comb scale with lateral spines
Aedes aegypti

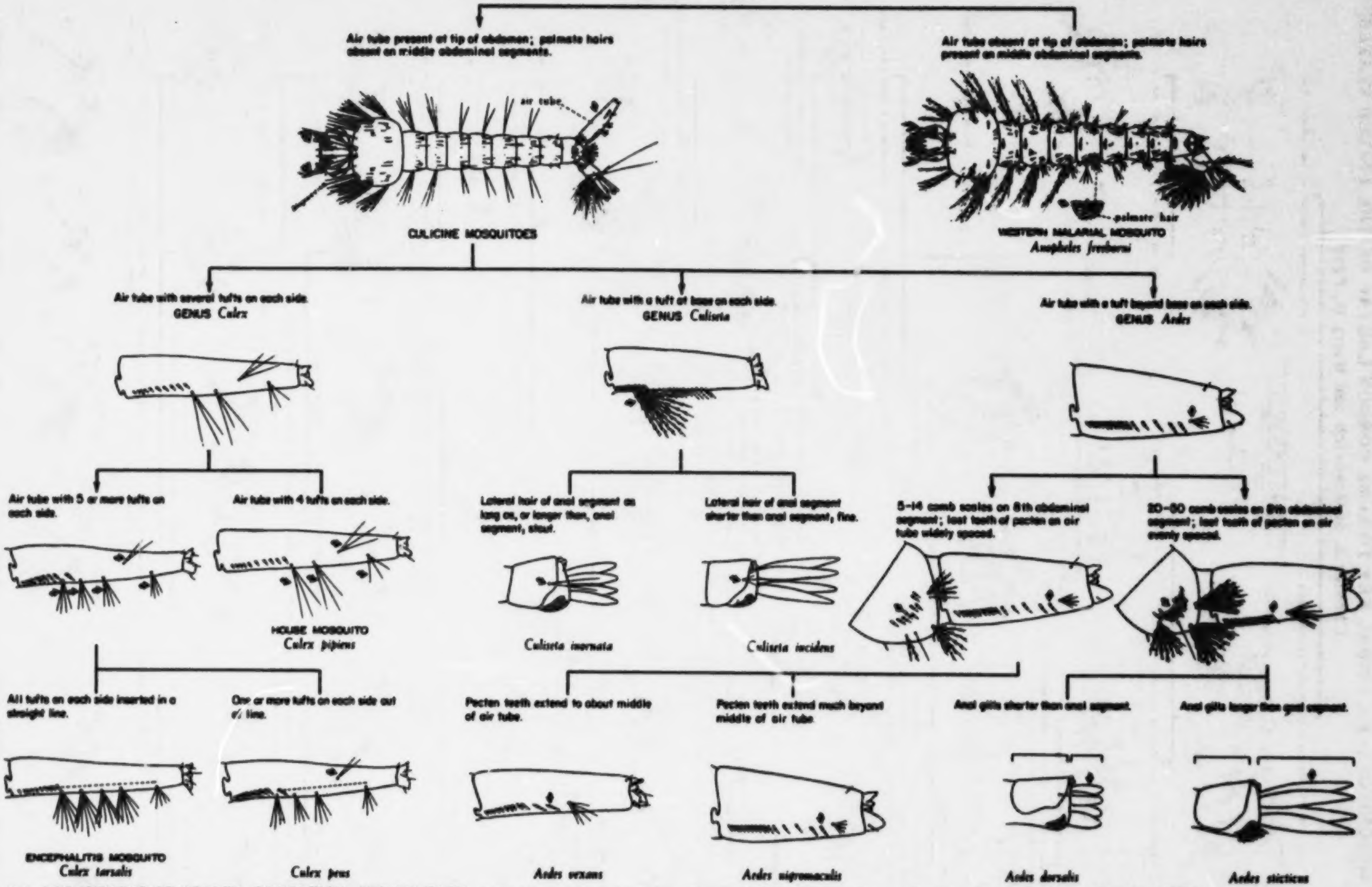
comb scale with fringe
Aedes triseriatus

air tube about 2 times as long as wide
Aedes dorsalis

air tube about 3 to 4 times as long as wide
Aedes canadensis

MOSQUITOES: PICTORIAL KEY TO SOME COMMON LARVAE OF WESTERN UNITED STATES

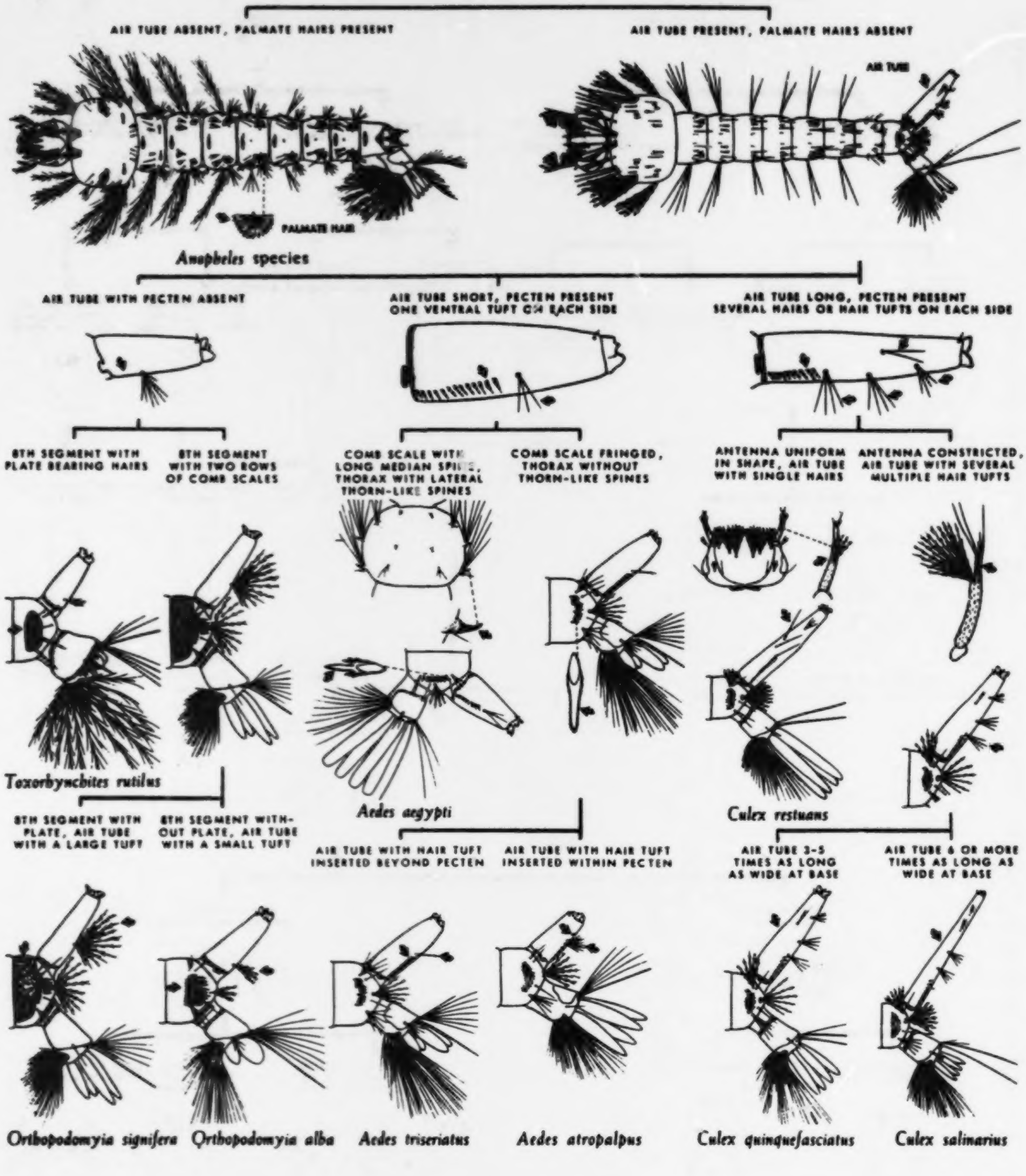
Harry D. Pratt


Air tube present at tip of abdomen; palmate hairs absent on middle abdominal segments.
Air tube absent at tip of abdomen; palmate hairs present on middle abdominal segments.
air tube
palmate hair
CULICINE MOSQUITOES
WESTERN MALARIAL MOSQUITO
Anopheles freeborni
Air tube with several tufts on each side.
GENUS Culex
Air tube with a tuft at base on each side.
GENUS Culiseta
Air tube with a tuft beyond base on each side.
GENUS Aedes
Air tube with 5 or more tufts on each side.
Air tube with 4 tufts on each side.
Lateral hair of anal segment as long as, or longer than, anal segment, stout.
Lateral hair of anal segment shorter than anal segment, fine.
5–14 comb scales on 8th abdominal segment; last teeth of pecten on air tube widely spaced.
20–30 comb scales on 8th abdominal segment; last teeth of pecten on air evenly spaced.
HOUSE MOSQUITO
Culex pipiens
Culiseta inornata
Culiseta incidens
All tufts on each side inserted in a straight line.
One or more tufts on each side out of line.
Pecten teeth extend to about middle of air tube.
Pecten teeth extend much beyond middle of air tube.
Anal gills shorter than anal segment.
Anal gills longer than anal segment.
ENCEPHALITIS MOSQUITO
Culex tarsalis
Culex peus
Aedes vexans
Aedes nigromaculis
Aedes dorsalis
Aedes sticticus

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1960

MOSQUITOES: PICTORIAL KEY TO SOME LARVAE COMMONLY FOUND IN ARTIFICIAL CONTAINERS

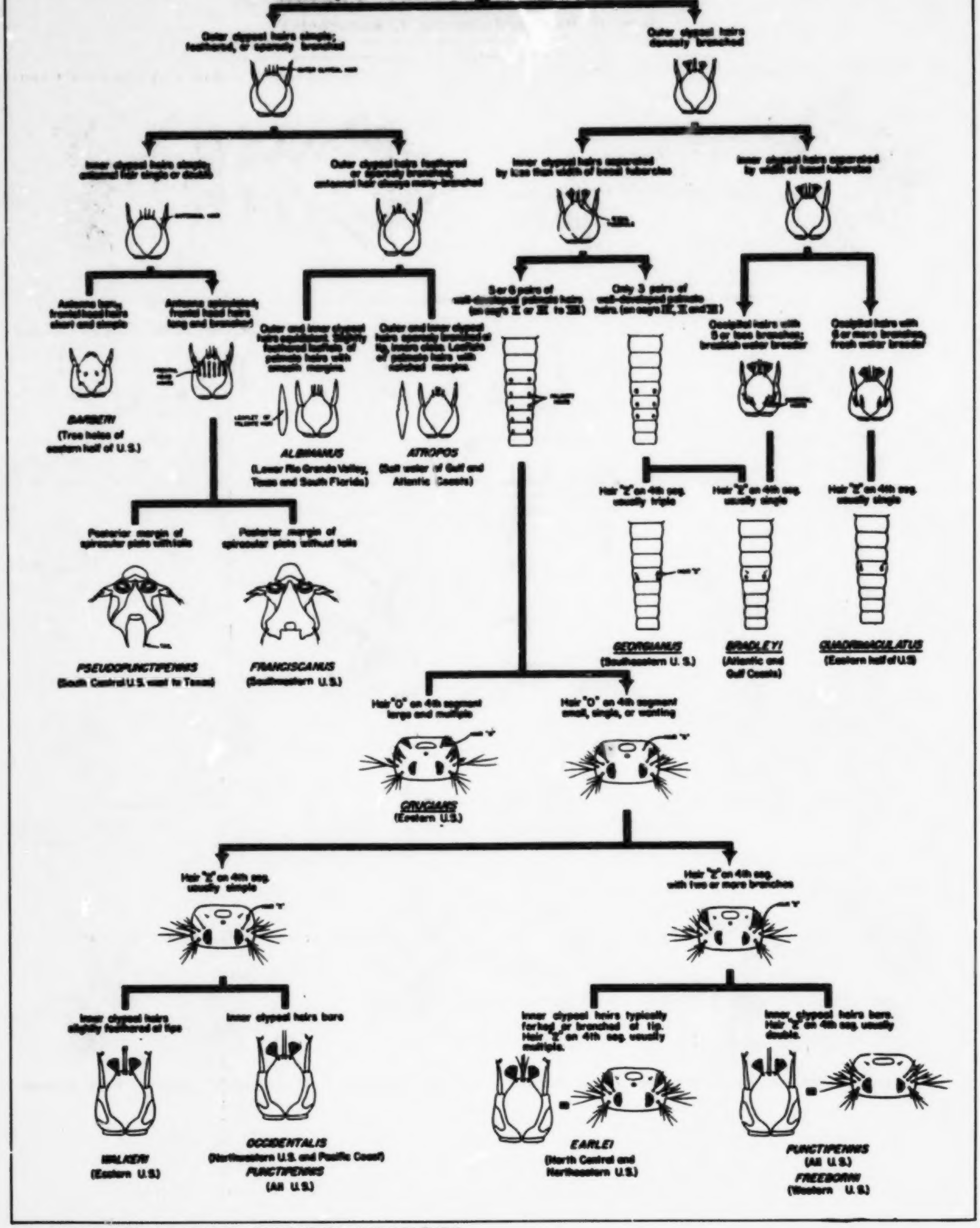
Harry D. Pratt and Chester J. Stojanovich


AIR TUBE ABSENT, PALMATE HAIRS PRESENT
AIR TUBE PRESENT, PALMATE HAIRS ABSENT
AIR TUBE
PALMATE HAIR
Anopheles species
AIR TUBE WITH PECTEN ABSENT
AIR TUBE SHORT, PECTEN PRESENT ONE VENTRAL TUFT ON EACH SIDE
AIR TUBE LONG, PECTEN PRESENT SEVERAL HAIRS OR HAIR TUFTS ON EACH SIDE
8TH SEGMENT WITH PLATE BEARING HAIRS
8TH SEGMENT WITH TWO ROWS OF COMB SCALES
COMB SCALE WITH LONG MEDIAN SPINE, THORAX WITH LATERAL THORN-LIKE SPINES
COMB SCALE FRINGED, THORAX WITHOUT THORN-LIKE SPINES
ANTENNA UNIFORM IN SHAPE, AIR TUBE WITH SINGLE HAIRS
ANTENNA CONSTRICTED, AIR TUBE WITH SEVERAL MULTIPLE HAIR TUFTS
Toxorhynchites rutilus
Aedes aegypti
Culex restuans
8TH SEGMENT WITH PLATE, AIR TUBE WITH A LARGE TUFT
8TH SEGMENT WITHOUT PLATE, AIR TUBE WITH A SMALL TUFT
AIR TUBE WITH HAIR TUFT INSERTED BEYOND PECTEN
AIR TUBE WITH HAIR TUFT INSERTED WITHIN PECTEN
AIR TUBE 3-5 TIMES AS LONG AS WIDE AT BASE
AIR TUBE 6 OR MORE TIMES AS LONG AS WIDE AT BASE
Orthopodomyia signifera
Orthopodomyia alba
Aedes triseriatus
Aedes atropalpus
Culex quinquefasciatus
Culex salinarius

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

MOSQUITOES: PICTORIAL KEY TO ANOPHELINE LARVAE OF THE UNITED STATES

Stanley B. Freeborn and Eugene J. Gerberg


Outer clypeal hairs simple, feathered, or sparsely branched
Outer clypeal hairs densely branched
Inner clypeal hairs simple; antennal hair single or double
Outer clypeal hairs feathered or sparsely branched; antennal hair always many-branched
Inner clypeal hairs separated by less than width of basal tubercles
Inner clypeal hairs separated by width of basal tubercles
Antenna bare, frontal head hairs short and simple
Antenna spiculated, frontal head hairs long and branched
Outer and inner clypeal hairs equidistant. Slightly feathered leaflets of palmate hairs with smooth margins.
Outer and inner clypeal hairs sparsely branched at tip, bases close. Leaflets of palmate hairs with notched margins.
5 or 6 pairs of well-developed palmate hairs (on seg's II or III to VII)
Only 3 pairs of well-developed palmate hairs (on seg's IV, V and VI)
Occipital hairs with 5 or less branches; brackish water breeder
Occipital hairs with 6 or more branches; fresh water breeder
BARBERI
(Tree holes of eastern half of U.S.)
ALBIMANUS
(Lower Rio Grande Valley, Texas and South Florida)
ATROPOS
(Salt water of Gulf and Atlantic Coasts)
Hair "Z" on 4th seg. usually triple
Hair "Z" on 4th seg. usually single
Hair "Z" on 4th seg. usually single
hair "Y"
GEORGIANUS
(Southeastern U. S.)
BRADLEYI
(Atlantic and Gulf Coasts)
QUADRIMACULATUS
(Eastern half of U.S.)
Posterior margin of spiracular plate with tails
Posterior margin of spiracular plate without tails
PSEUDOPUNCTIPENNIS
(South Central U.S. west to Texas)
FRANCISCANUS
(Southwestern U.S.)
Hair "O" on 4th segment large and multiple
Hair "O" on 4th segment small, single, or wanting
hair "Y"
hair "Y"
CRUCIANS
(Eastern U.S.)
Hair "Z" on 4th seg. usually simple
Hair "Z" on 4th seg. with two or more branches
hair "Y"
hair "Y"
Inner clypeal hairs slightly feathered at tips
Inner clypeal hairs bare
Inner clypeal hairs typically forked or branched at tip. Hair "Z" on 4th seg. usually multiple.
Inner clypeal hairs bare. Hair "Z" on 4th seg. usually double.
WALKERI
(Eastern U.S.)
OCCIDENTALIS
(Northwestern U.S. and Pacific Coast)
PUNCTIPENNIS
(All U.S.)
EARLEI
(North Central and Northeastern U.S.)
PUNCTIPENNIS
(All U.S.)
FREEBORNI
(Western U.S.)

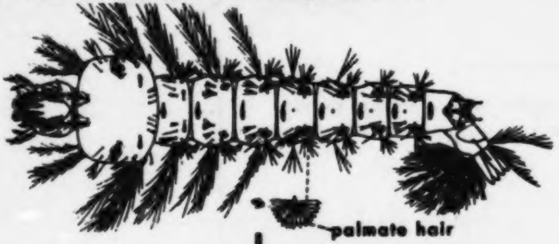
U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1943, Revised 1950, 1951, 1953

MOSQUITOES: PICTORIAL KEY TO SOME LARVAE OF FLORIDA COMMONLY FOUND IN CONTAINERS

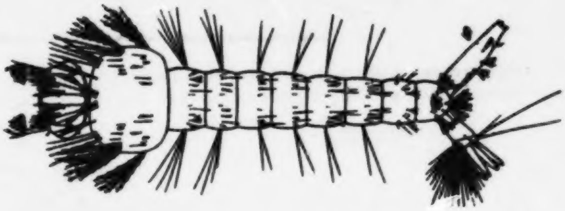
Chester J. Stojanovich and Harry D. Pratt

PART I

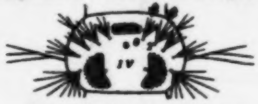
air tube absent; abdomen with palmate hairs



air tube present; abdomen without palmate hairs

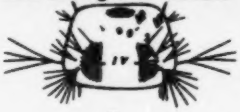


hairs 0 and 2 on abdominal segments 4 and 5 multiple

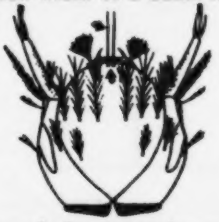


Anopheles crucians

hair 0 rudimentary or absent, hair 2 single or double

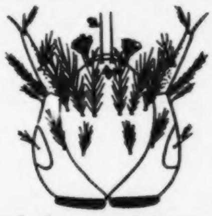


inner clypeal hairs separated by less than width of a basal tubercle



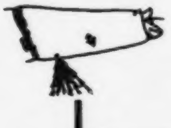
Anopheles punctipennis

inner clypeal hairs separated by at least width of a basal tubercle

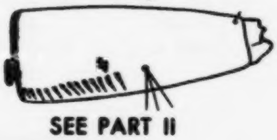


Anopheles quadrimaculatus

air tube without pecten

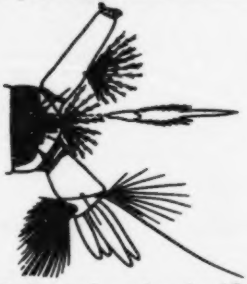


air tube with pecten



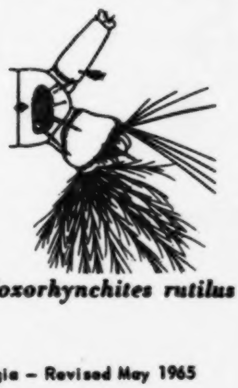
SEE PART II

comb scales present on 8th abdomial segment



Orthopodomyia signifera

comb scales absent on 8th abdominal segment



Toxorhynchites rutilus

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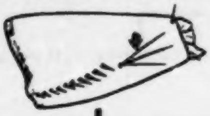
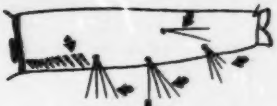
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – Revised May 1965

PART II

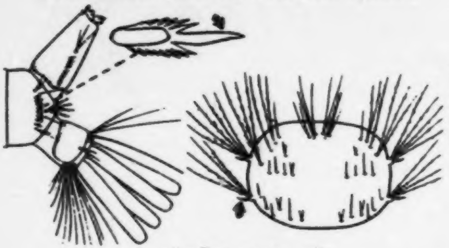
air tube with one hair or tuft on each side



air tube with several hairs or tufts on each side

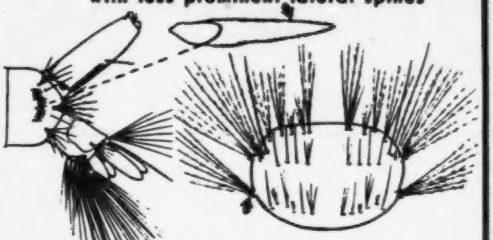


comb scales with a strong median spine,
thorax with prominent lateral spines



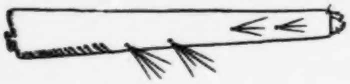
Aedes aegypti

comb scales with a fringe, thorax
with less prominent lateral spines

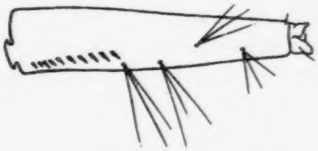


Aedes triseriatus

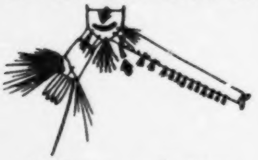
air tube at least 6 times as long as wide



air tube 3-5 times as long as wide

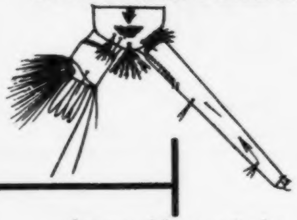


comb scales in a single row
air tube with a basal tuft



Culiseta melanura

comb scales in a patch,
air tube without a basal tuft

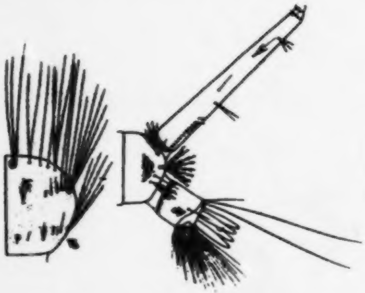


thorax with spicules,
lateral hair of saddle single

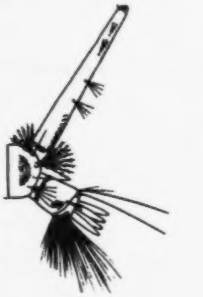
thorax without spicules,
lateral hair of saddle double

antenna with tuft
inserted at middle
air tube with 3 pairs
of long single hairs

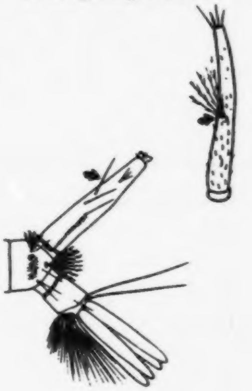
antenna with tuft
inserted beyond middle
air tube with 4 pairs
of multiple tufts



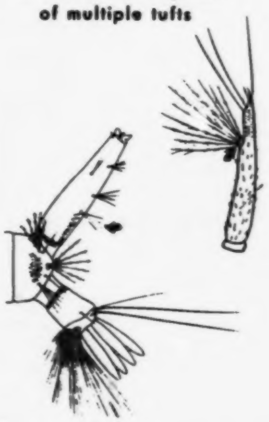
Culex nigripalpus



Culex salinarius



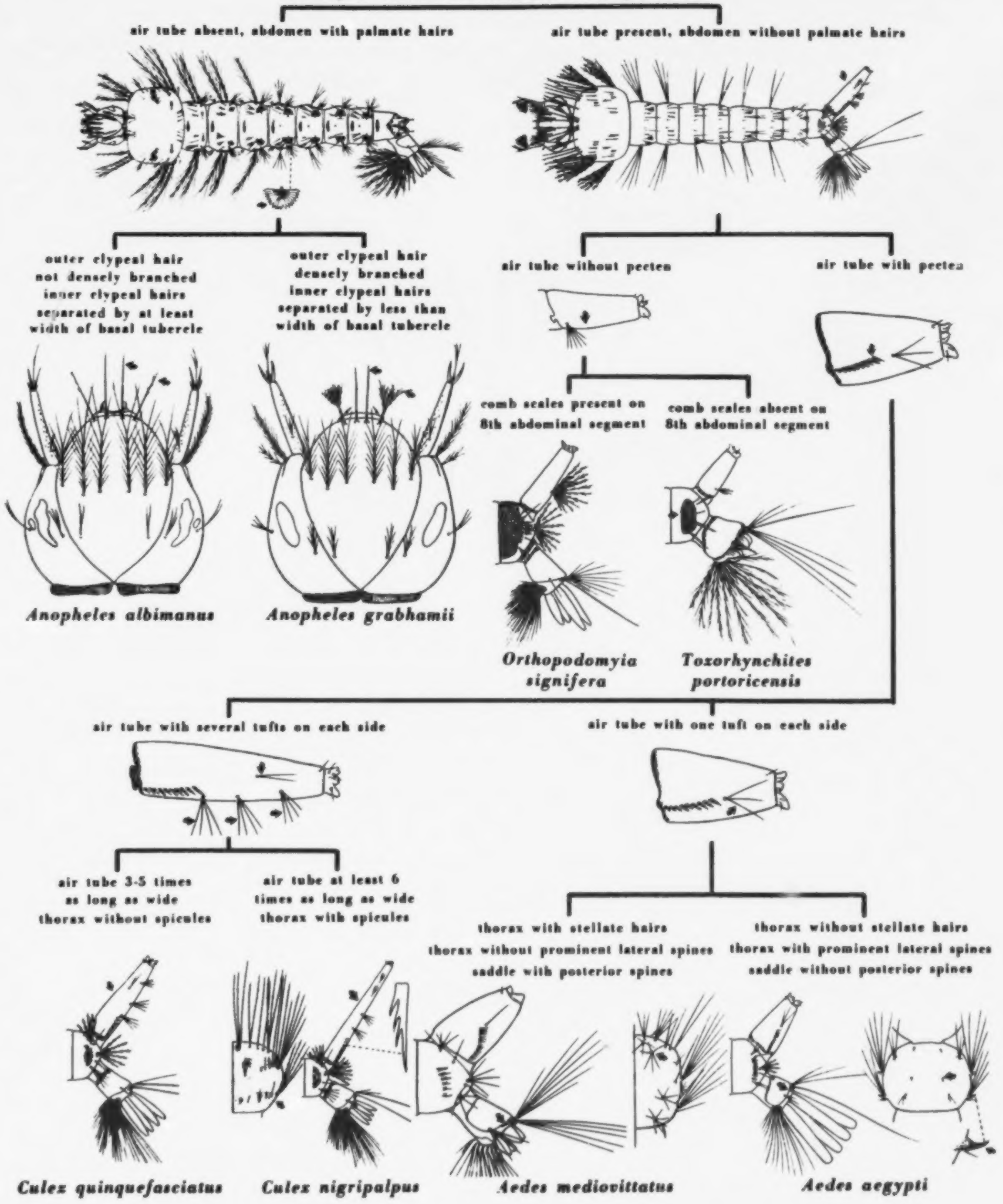
Culex restuans



Culex quinquefasciatus

MOSQUITOES: PICTORIAL KEY TO SOME COMMON LARVAE OF PUERTO RICO FOUND IN CONTAINERS

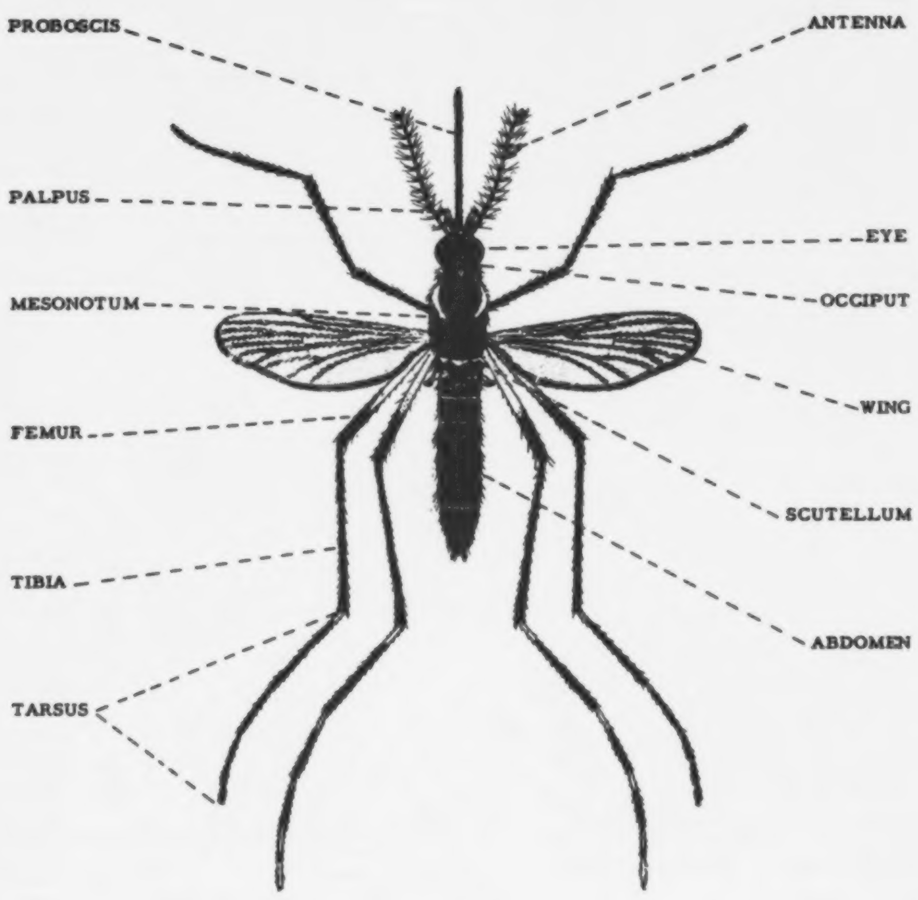
Harry D. Pratt and Chester J. Stojanovich


air tube absent, abdomen with palmate hairs
air tube present, abdomen without palmate hairs
outer clypeal hair not densely branched inner clypeal hairs separated by at least width of basal tubercle
outer clypeal hair densely branched inner clypeal hairs separated by less than width of basal tubercle
Anopheles albimanus
Anopheles grabhamii
air tube without pecten
air tube with pecten
comb scales present on 8th abdominal segment
comb scales absent on 8th abdominal segment
Orthopodomyia signifera
Toxorhynchites portoricensis
air tube with several tufts on each side
air tube with one tuft on each side
air tube 3-5 times as long as wide thorax without spicules
air tube at least 6 times as long as wide thorax with spicules
Culex quinquefasciatus
Culex nigripalpus
thorax with stellate hairs thorax without prominent lateral spines saddle with posterior spines
thorax without stellate hairs thorax with prominent lateral spines saddle without posterior spines
Aedes mediovittatus
Aedes aegypti

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1965

MOSQUITO DIAGRAM – ADULT FEMALE AEDES

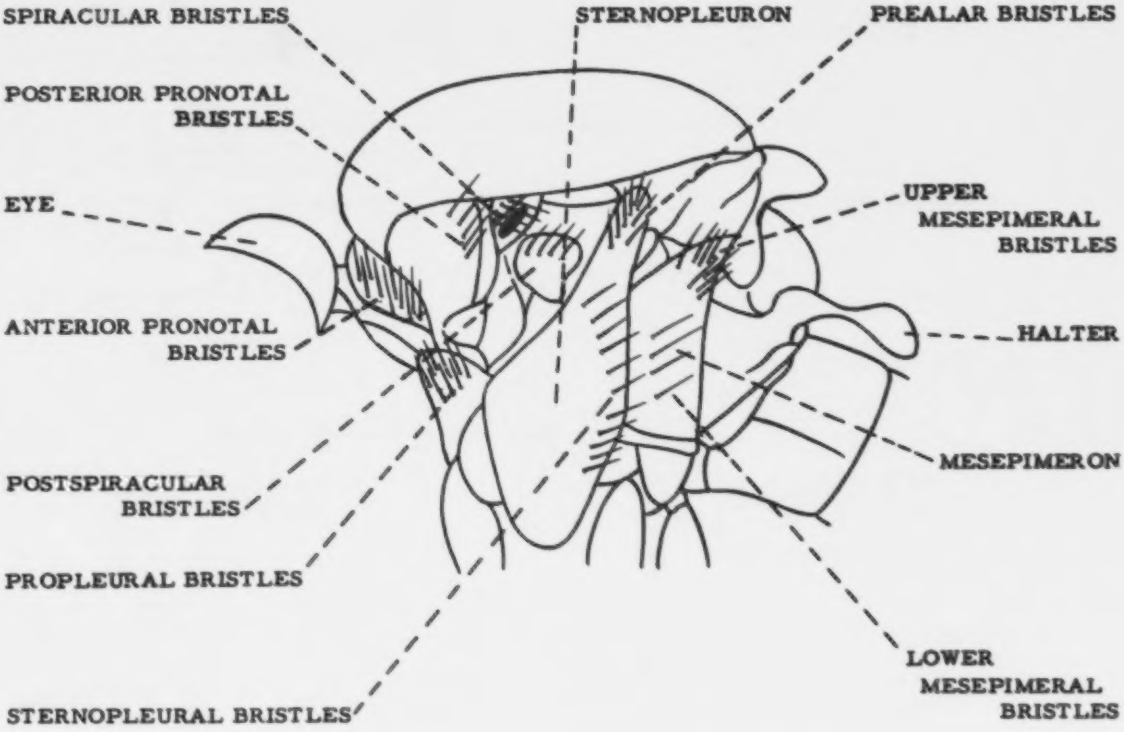
Chester J. Stojanovich and Harold George Scott


PROBOSCIS
ANTENNA
PALPUS
EYE
MESONOTUM
OCCIPUT
WING
FEMUR
SCUTELLUM
TIBIA
ABDOMEN
TARSUS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1966

MOSQUITO DIAGRAM – LATERAL ASPECT OF MOSQUITO THORAX

Chester J. Stojanovich

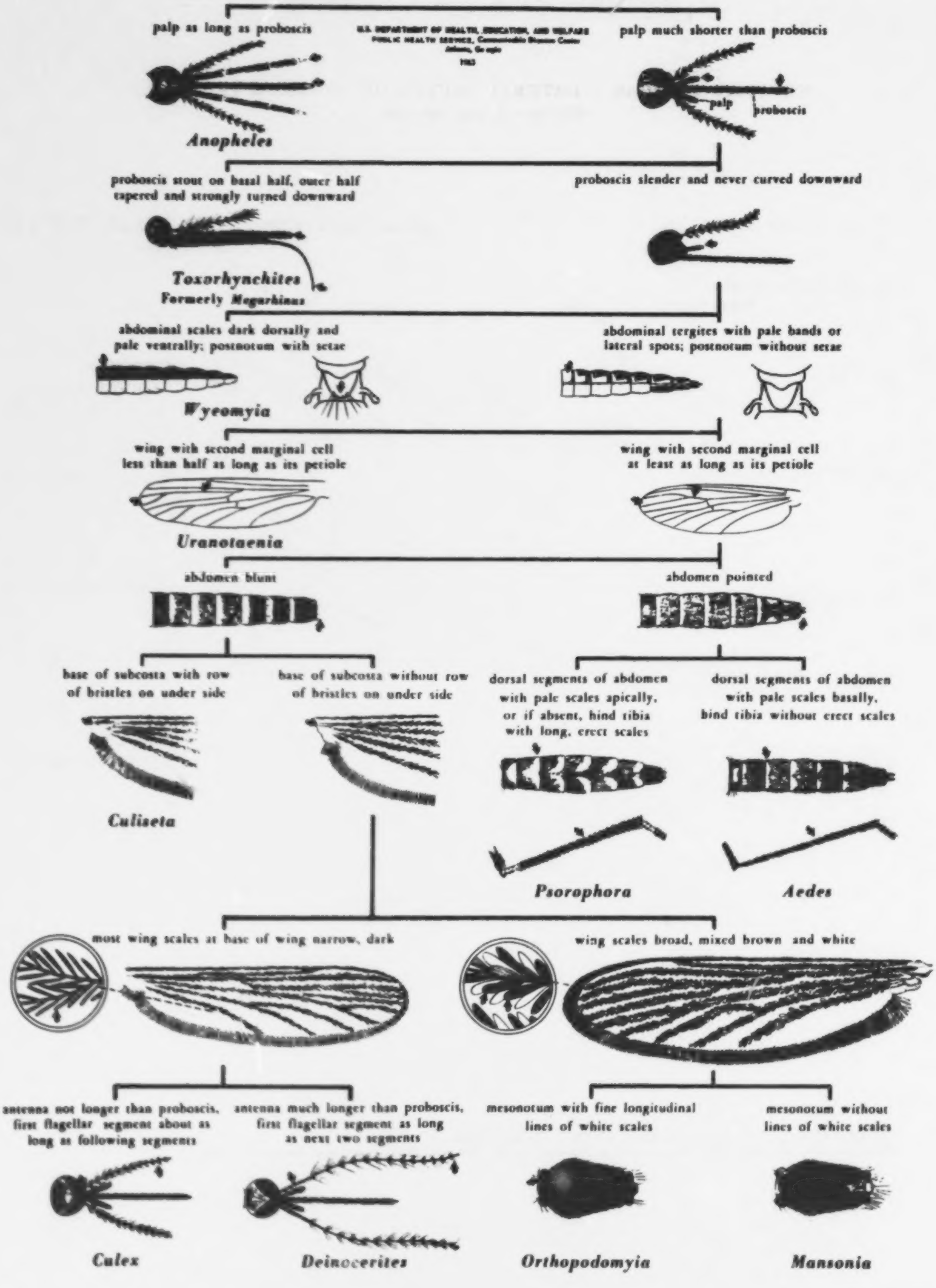

SPIRACULAR BRISTLES
STERNOPLEURON
PREALAR BRISTLES
POSTERIOR PRONOTAL BRISTLES
EYE
UPPER MESEPIMERAL BRISTLES
ANTERIOR PRONOTAL BRISTLES
HALTER
MESEPIMERON
POSTSPIRACULAR BRISTLES
PROPLEURAL BRISTLES
LOWER MESEPIMERAL BRISTLES
STERNOPLEURAL BRISTLES

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1960

MOSQUITOES: PICTORIAL KEY TO UNITED STATES GENERA OF ADULTS (FEMALE)

Harry D. Pratt and Chester J. Stojanovich

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center
Atlanta, Georgia
1963



palp as long as proboscis — ***Anopheles***

palp much shorter than proboscis

proboscis stout on basal half, outer half tapered and strongly turned downward — ***Toxorhynchites***
Formerly *Megarhinus*

proboscis slender and never curved downward

abdominal scales dark dorsally and pale ventrally; postnotum with setae — ***Wyeomyia***

abdominal tergites with pale bands or lateral spots; postnotum without setae

wing with second marginal cell less than half as long as its petiole — ***Uranotaenia***

wing with second marginal cell at least as long as its petiole

abdomen blunt

abdomen pointed

base of subcosta with row of bristles on under side — ***Culiseta***

base of subcosta without row of bristles on under side

dorsal segments of abdomen with pale scales apically, or if absent, hind tibia with long, erect scales — ***Psorophora***

dorsal segments of abdomen with pale scales basally, hind tibia without erect scales — ***Aedes***

most wing scales at base of wing narrow, dark

wing scales broad, mixed brown and white

antenna not longer than proboscis, first flagellar segment about as long as following segments — ***Culex***

antenna much longer than proboscis, first flagellar segment as long as next two segments — ***Deinocerites***

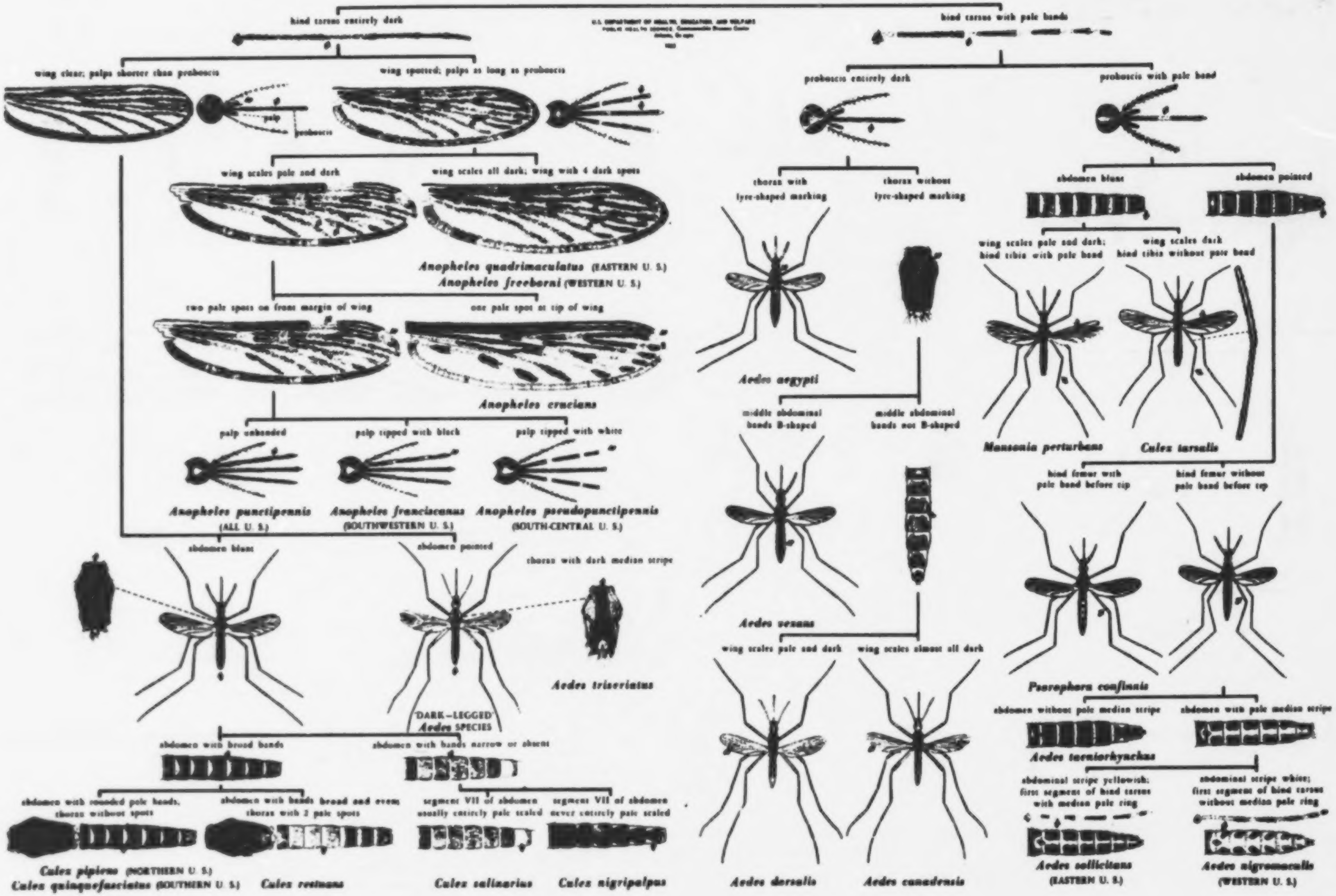
mesonotum with fine longitudinal lines of white scales — ***Orthopodomyia***

mesonotum without lines of white scales — ***Mansonia***

MOSQUITOES: PICTORIAL KEY TO SOME COMMON ADULTS (FEMALE) OF THE UNITED STATES

Harry D. Pratt and Chester J. Stojanovich

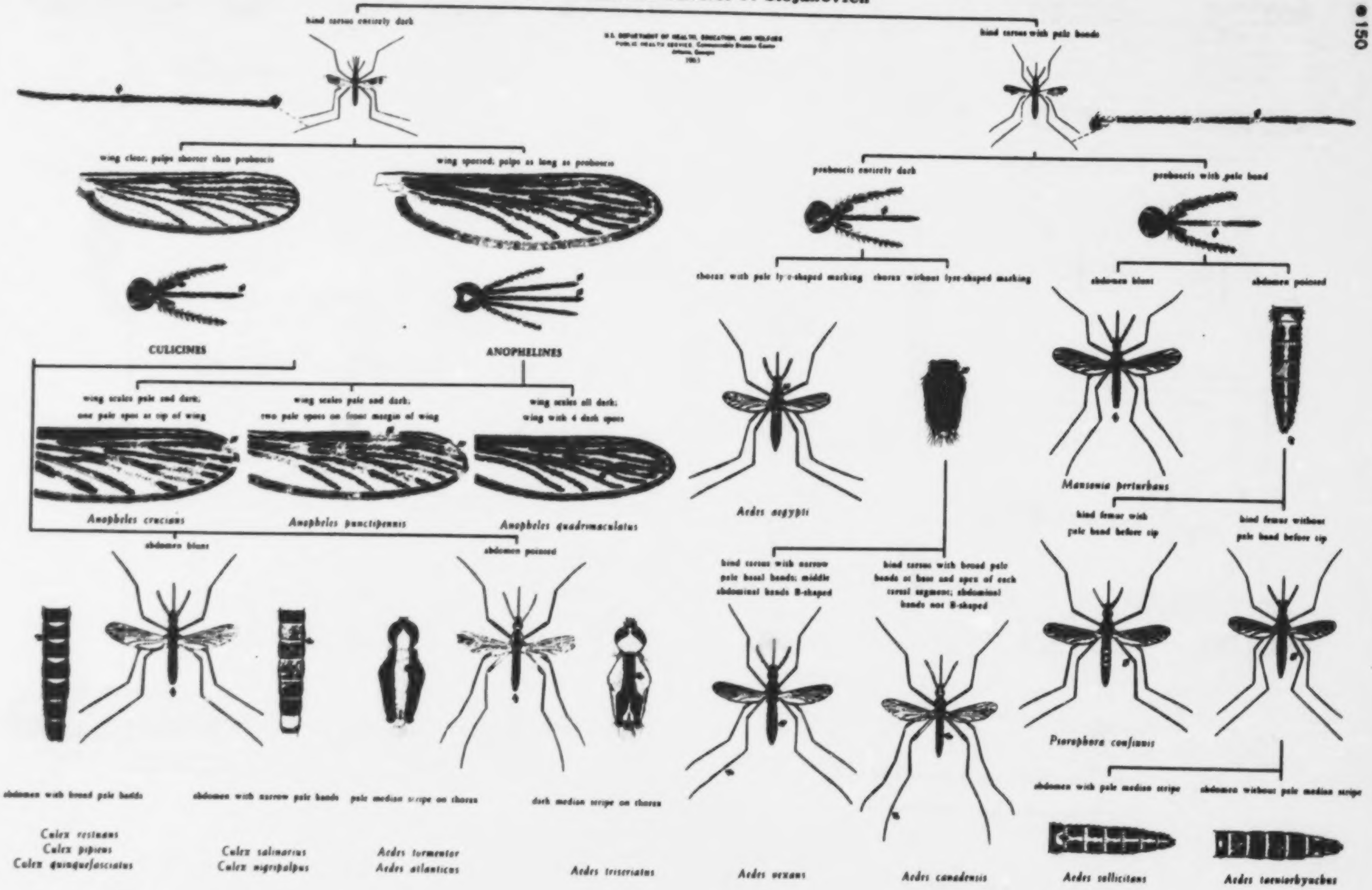
U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE Communicable Disease Center
Atlanta, Georgia


hind tarsus entirely dark
hind tarsus with pale bands
wing clear; palps shorter than proboscis
palp
proboscis
wing spotted; palps as long as proboscis
wing scales pale and dark
wing scales all dark; wing with 4 dark spots
Anopheles quadrimaculatus (EASTERN U. S.)
Anopheles freeborni (WESTERN U. S.)
two pale spots on front margin of wing
one pale spot at tip of wing
Anopheles crucians
palp unbanded
palp tipped with black
palp tipped with white
Anopheles punctipennis
(ALL U. S.)
Anopheles franciscanus
(SOUTHWESTERN U. S.)
Anopheles pseudopunctipennis
(SOUTH-CENTRAL U. S.)
abdomen blunt
abdomen pointed
thorax with dark median stripe
Aedes triseriatus
"DARK-LEGGED" Aedes SPECIES
abdomen with broad bands
abdomen with bands narrow or absent
abdomen with rounded pale bands; thorax without spots
abdomen with bands broad and even; thorax with 2 pale spots
segment VII of abdomen usually entirely pale scaled
segment VII of abdomen never entirely pale scaled
Culex pipiens (NORTHERN U. S.)
Culex quinquefasciatus (SOUTHERN U. S.)
Culex restuans
Culex salinarius
Culex nigripalpus
proboscis entirely dark
proboscis with pale band
thorax with lyre-shaped marking
thorax without lyre-shaped marking
Aedes aegypti
middle abdominal bands B-shaped
middle abdominal bands not B-shaped
Aedes vexans
wing scales pale and dark
wing scales almost all dark
Aedes dorsalis
Aedes canadensis
abdomen blunt
abdomen pointed
wing scales pale and dark; hind tibia with pale band
wing scales dark; hind tibia without pale band
Mansonia perturbans
Culex tarsalis
hind femur with pale band before tip
hind femur without pale band before tip
Psorophora confinnis
abdomen without pale median stripe
abdomen with pale median stripe
Aedes taeniorhynchus
abdominal stripe yellowish; first segment of hind tarsus with median pale ring
abdominal stripe white; first segment of hind tarsus without median pale ring
Aedes sollicitans
(EASTERN U. S.)
Aedes nigromaculis
(WESTERN U. S.)

MOSQUITOES: PICTORIAL KEY TO SOME ADULTS (FEMALE) IN EASTERN UNITED STATES

Harry D. Pratt and Chester J. Stojanovich

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center
Atlanta, Georgia
1963


hind tarsus entirely dark
hind tarsus with pale bands
wing clear; palps shorter than proboscis
wing spotted; palps as long as proboscis
CULICINES
ANOPHELINES
wing scales pale and dark; one pale spot at tip of wing
wing scales pale and dark; two pale spots on front margin of wing
wing scales all dark; wing with 4 dark spots
Anopheles crucians
Anopheles punctipennis
Anopheles quadrimaculatus
abdomen blunt
abdomen pointed
abdomen with broad pale bands
abdomen with narrow pale bands
pale median stripe on thorax
dark median stripe on thorax
Culex restuans
Culex pipiens
Culex quinquefasciatus
Culex salinarius
Culex nigripalpus
Aedes tormentor
Aedes atlanticus
Aedes triseriatus
proboscis entirely dark
proboscis with pale band
thorax with pale lyre-shaped marking
thorax without lyre-shaped marking
Aedes aegypti
hind tarsus with narrow pale basal bands; middle abdominal bands B-shaped
hind tarsus with broad pale bands at base and apex of each tarsal segment; abdominal bands not B-shaped
Aedes vexans
Aedes canadensis
abdomen blunt
abdomen pointed
Mansonia perturbans
hind femur with pale band before tip
hind femur without pale band before tip
Psorophora confinnis
abdomen with pale median stripe
abdomen without pale median stripe
Aedes sollicitans
Aedes taeniorhynchus

MOSQUITOES: PICTORIAL KEY TO SOME COMMON ADULTS (FEMALE) OF WESTERN UNITED STATES

Harry D. Pratt and Chester J. Stojanovich

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center
Atlanta, Georgia
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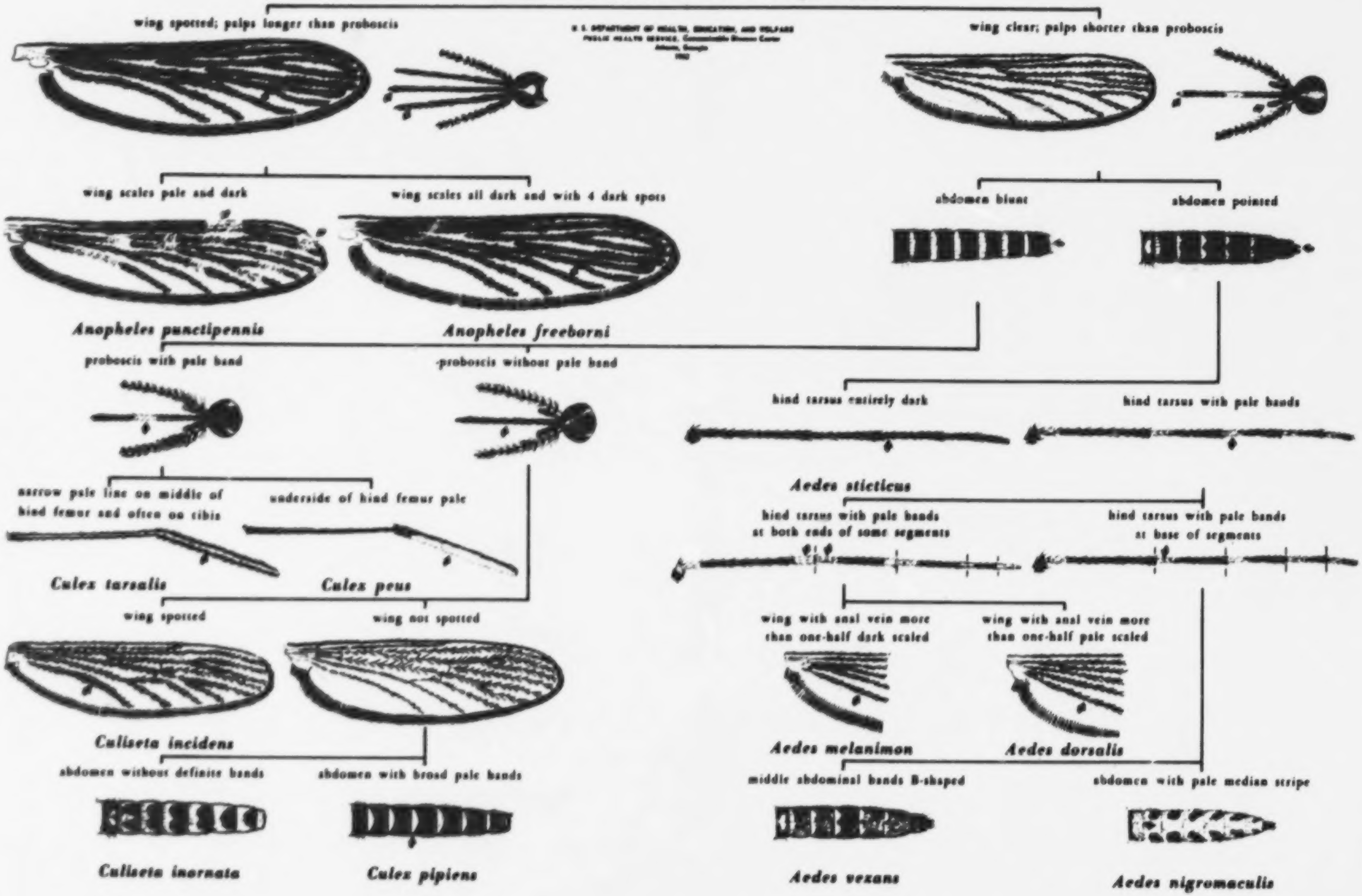
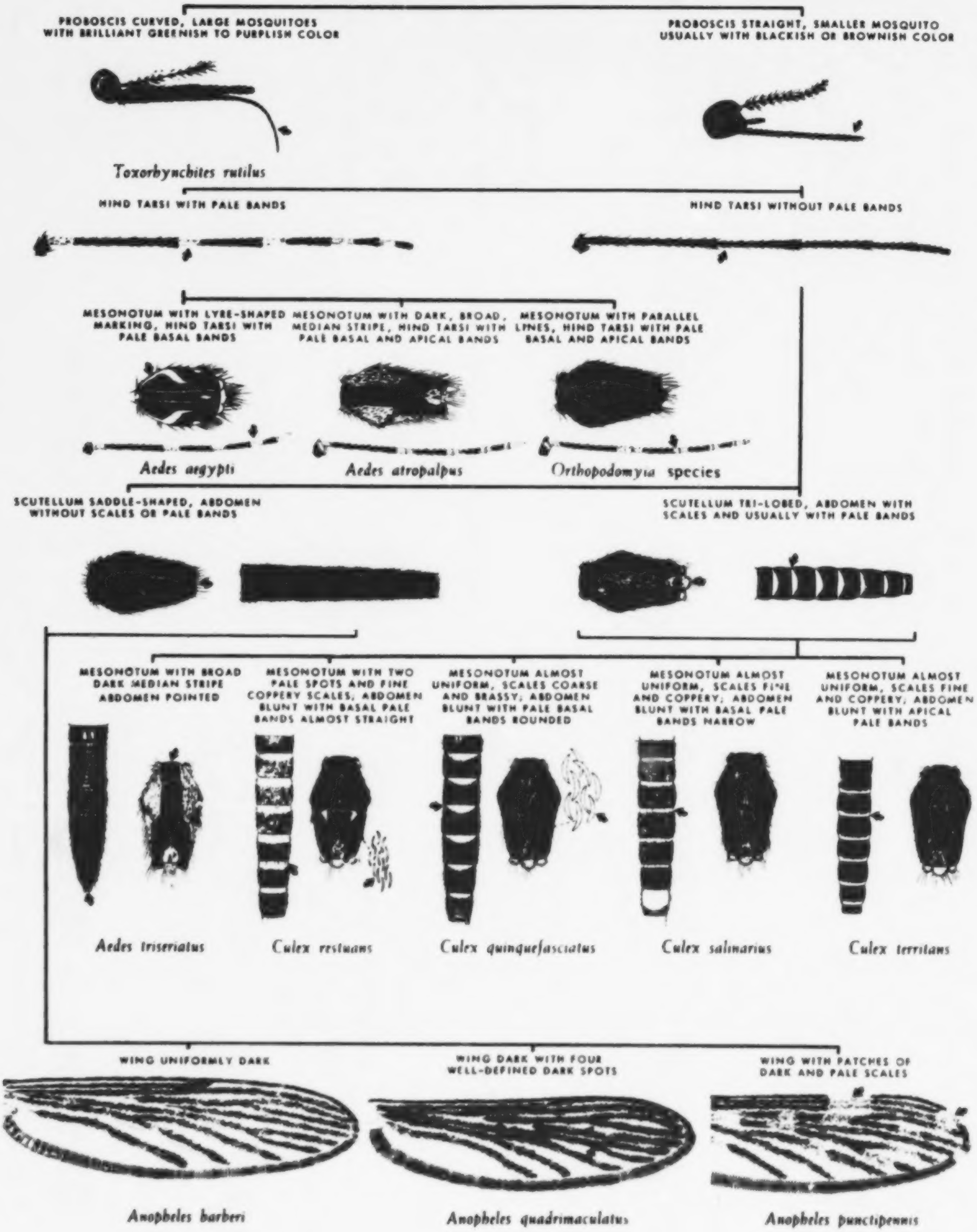

wing spotted; palps longer than proboscis
wing clear; palps shorter than proboscis
wing scales pale and dark
wing scales all dark and with 4 dark spots
abdomen blunt
abdomen pointed
Anopheles punctipennis
Anopheles freeborni
proboscis with pale band
proboscis without pale band
hind tarsus entirely dark
hind tarsus with pale bands
narrow pale line on middle of hind femur and often on tibia
underside of hind femur pale
Aedes sticticus
hind tarsus with pale bands at both ends of some segments
hind tarsus with pale bands at base of segments
Culex tarsalis
Culex peus
wing spotted
wing not spotted
wing with anal vein more than one-half dark scaled
wing with anal vein more than one-half pale scaled
Culiseta incidens
Aedes melanimon
Aedes dorsalis
abdomen without definite bands
abdomen with broad pale bands
middle abdominal bands B-shaped
abdomen with pale median stripe
Culiseta inornata
Culex pipiens
Aedes vexans
Aedes nigromaculis

● 152

MOSQUITOES: PICTORIAL KEY TO SOME ADULTS COMMONLY ASSOCIATED WITH AEDES AEGYPTI

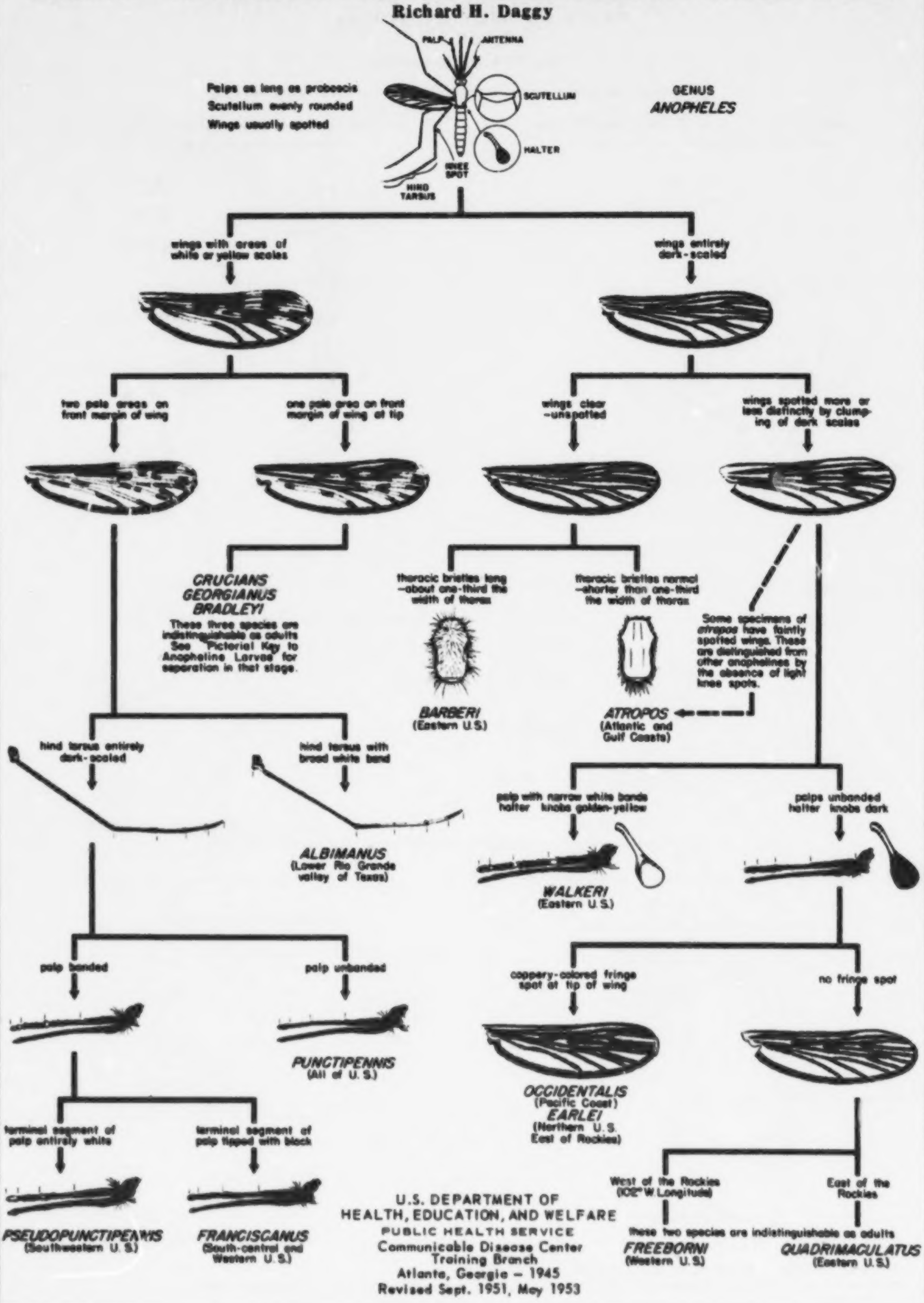
Harry D. Pratt and Chester J. Stojanovich


PROBOSCIS CURVED, LARGE MOSQUITOES WITH BRILLIANT GREENISH TO PURPLISH COLOR
PROBOSCIS STRAIGHT, SMALLER MOSQUITO USUALLY WITH BLACKISH OR BROWNISH COLOR
Toxorhynchites rutilus
HIND TARSI WITH PALE BANDS
HIND TARSI WITHOUT PALE BANDS
MESONOTUM WITH LYRE-SHAPED MARKING, HIND TARSI WITH PALE BASAL BANDS
MESONOTUM WITH DARK, BROAD, MEDIAN STRIPE, HIND TARSI WITH PALE BASAL AND APICAL BANDS
MESONOTUM WITH PARALLEL LINES, HIND TARSI WITH PALE BASAL AND APICAL BANDS
Aedes aegypti
Aedes atropalpus
Orthopodomyia species
SCUTELLUM SADDLE-SHAPED, ABDOMEN WITHOUT SCALES OR PALE BANDS
SCUTELLUM TRI-LOBED, ABDOMEN WITH SCALES AND USUALLY WITH PALE BANDS
MESONOTUM WITH BROAD DARK MEDIAN STRIPE ABDOMEN POINTED
MESONOTUM WITH TWO PALE SPOTS AND FINE COPPERY SCALES; ABDOMEN BLUNT WITH BASAL PALE BANDS ALMOST STRAIGHT
MESONOTUM ALMOST UNIFORM, SCALES COARSE AND BRASSY; ABDOMEN BLUNT WITH PALE BASAL BANDS ROUNDED
MESONOTUM ALMOST UNIFORM, SCALES FINE AND COPPERY; ABDOMEN BLUNT WITH BASAL PALE BANDS NARROW
MESONOTUM ALMOST UNIFORM, SCALES FINE AND COPPERY; ABDOMEN BLUNT WITH APICAL PALE BANDS
Aedes triseriatus
Culex restuans
Culex quinquefasciatus
Culex salinarius
Culex territans
WING UNIFORMLY DARK
WING DARK WITH FOUR WELL-DEFINED DARK SPOTS
WING WITH PATCHES OF DARK AND PALE SCALES
Anopheles barberi
Anopheles quadrimaculatus
Anopheles punctipennis

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

MOSQUITOES: PICTORIAL KEY TO ADULT FEMALE ANOPHELINES OF UNITED STATES

Richard H. Daggy


PALP
ANTENNA
Palps as long as proboscis
Scutellum evenly rounded
Wings usually spotted
SCUTELLUM
HALTER
KNEE SPOT
HIND TARSUS
GENUS
ANOPHELES
wings with areas of white or yellow scales
wings entirely dark-scaled
two pale areas on front margin of wing
one pale area on front margin of wing at tip
wings clear —unspotted
wings spotted more or less distinctly by clumping of dark scales
CRUCIANS
GEORGIANUS
BRADLEYI
These three species are indistinguishable as adults See "Pictorial Key to Anopheline Larvae" for separation in that stage.
thoracic bristles long —about one-third the width of thorax
thoracic bristles normal —shorter than one-third the width of thorax
Some specimens of atropos have faintly spotted wings. These are distinguished from other anophelines by the absence of light knee spots.
BARBERI
(Eastern U.S.)
ATROPOS
(Atlantic and Gulf Coasts)
hind tarsus entirely dark-scaled
hind tarsus with broad white band
ALBIMANUS
(Lower Rio Grande valley of Texas)
palp with narrow white bands halter knobs golden-yellow
palps unbanded halter knobs dark
WALKERI
(Eastern U.S.)
palp banded
palp unbanded
PUNCTIPENNIS
(All of U.S.)
coppery-colored fringe spot at tip of wing
no fringe spot
OCCIDENTALIS
(Pacific Coast)
EARLEI
(Northern U.S. East of Rockies)
terminal segment of palp entirely white
terminal segment of palp tipped with black
PSEUDOPUNCTIPENNIS
(Southwestern U.S.)
FRANCISCANUS
(South-central and Western U.S.)
West of the Rockies (102° W Longitude)
East of the Rockies
these two species are indistinguishable as adults
FREEBORNI
(Western U.S.)
QUADRIMACULATUS
(Eastern U.S.)

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
Communicable Disease Center
Training Branch
Atlanta, Georgia – 1945
Revised Sept. 1951, May 1953

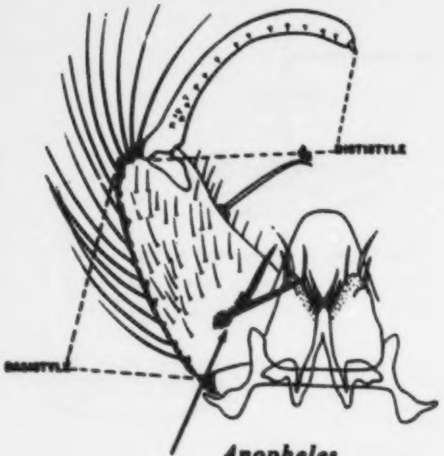
MOSQUITOES: PICTORIAL KEY TO UNITED STATES GENERA BASED ON MALE GENITALIA

PART I

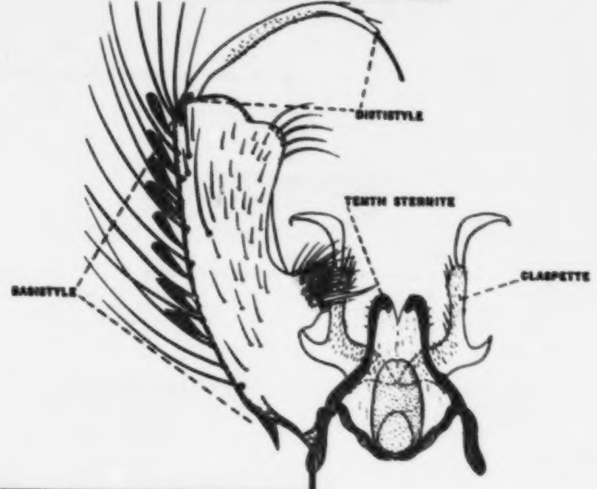
Chester J. Stojanovich

basistyle about equal in length to dististyle and with 1-2 stout setae near base

basistyle usually much shorter than dististyle, without 1-2 stout setae near base

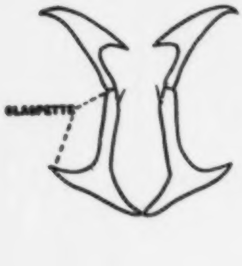

DISTISTYLE
BASISTYLE

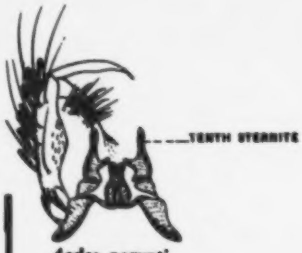
Anopheles


DISTISTYLE
TENTH STERNITE
CLASPETTE
BASISTYLE

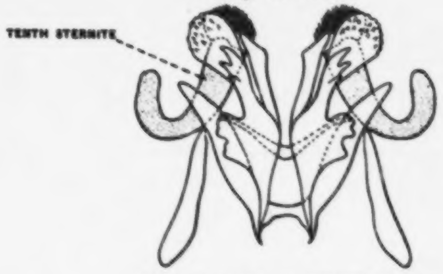
claspettes present 'absent only in *Aedes aegypti* as shown below'

claspette absent




TENTH STERNITE

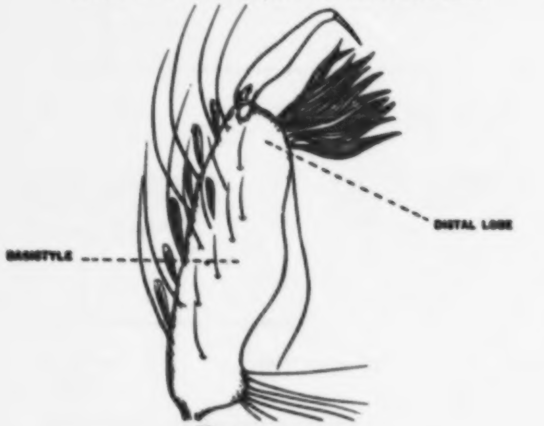
Aedes aegypti


TENTH STERNITE

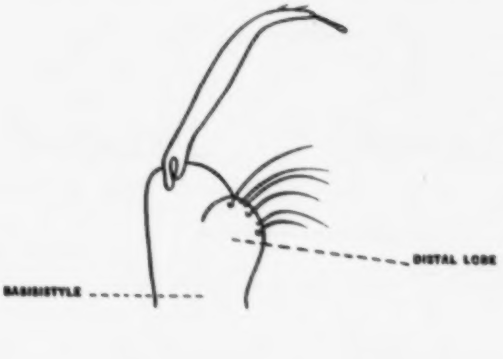
SEE PART II SECTION II

distal lobe of basistyle with leaf-like scales

distal lobe when present without leaf-like scales


DISTAL LOBE
BASISTYLE

Haemogogus


DISTAL LOBE
BASISISTYLE

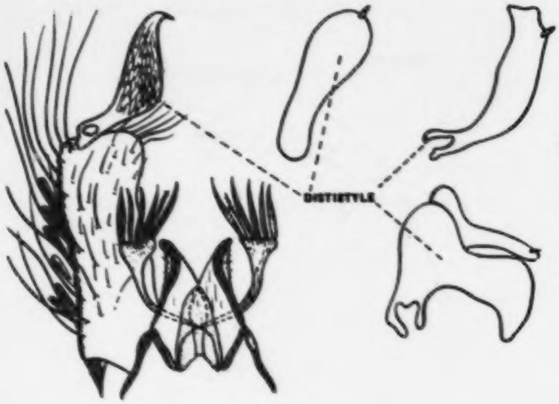
SEE PART II SECTION I

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964

PART II

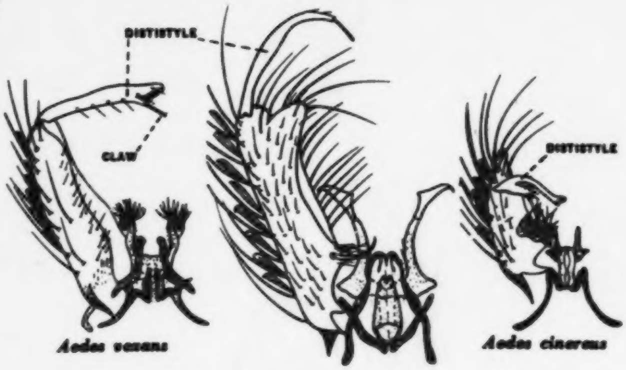
PART II SECTION I

dististyle not slender but variously shaped as shown below


DISTISTYLE

Psorophora

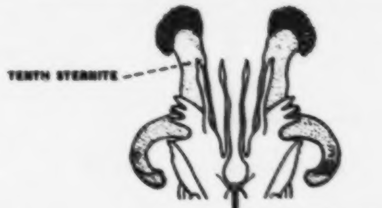
dististyle slender 'exceptions being *Aedes cinereus* with dististyle furcate at base and *Aedes vexans* with claw of dististyle not inserted at tip


DISTISTYLE
CLAW
DISTISTYLE
Aedes vexans
Aedes cinereus

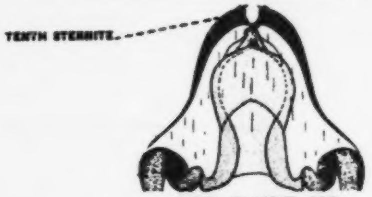
Aedes

PART II SECTION II

tenth sternite crowned with teeth or tuft of spines

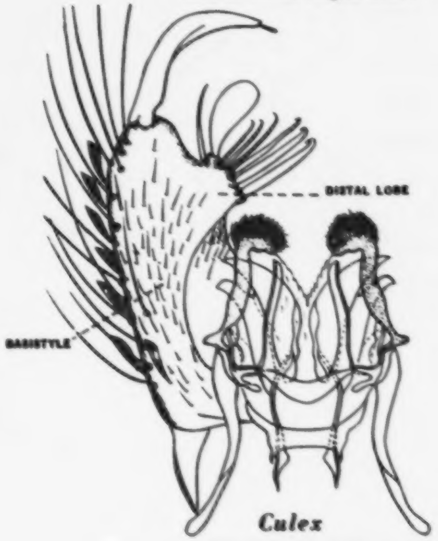

TENTH STERNITE

tenth sternite simple or with few teeth


TENTH STERNITE

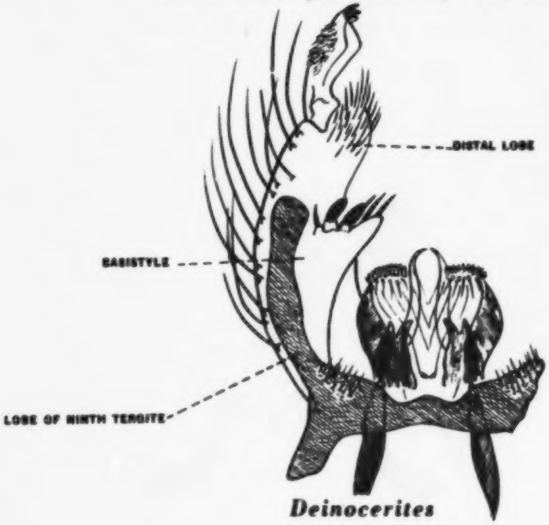
SEE PART III

distal lobe of basistyle with leaf-like scales or rods
lobe of ninth tergite short


DISTAL LOBE
BASISTYLE

Culex

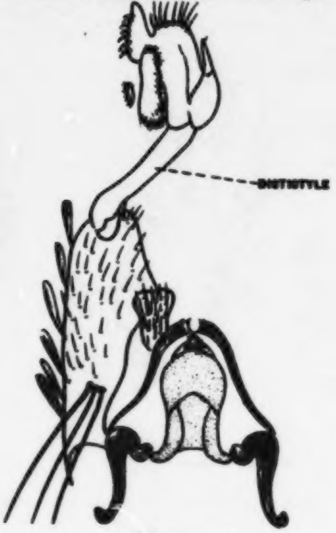
distal lobe of basistyle without leaf-like scales or rods
lobe of ninth tergite half as long as basistyle


DISTAL LOBE
BASISTYLE
LOBE OF NINTH TERGITE

Deinocerites

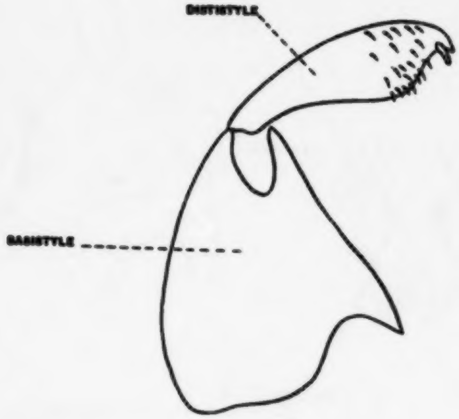
PART III

dististyle greatly modified at apex

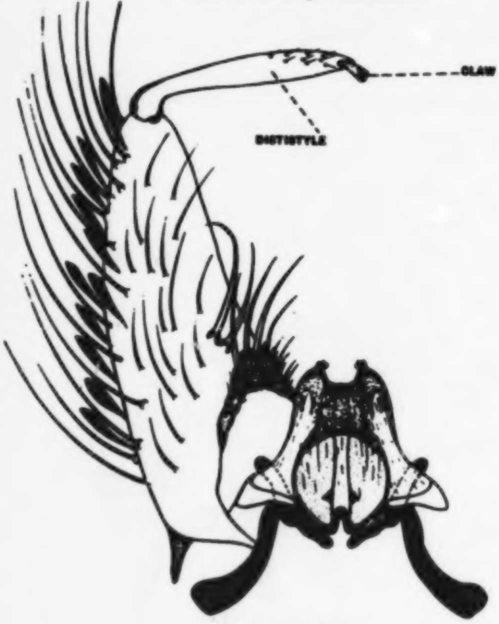

DISTISTYLE

Wyeomyia

dististyle not greatly modified at apex

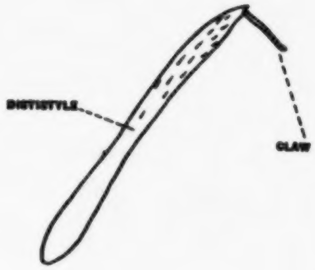

DISTISTYLE
BASISTYLE

claw of dististyle comb-like


CLAW
DISTISTYLE

Orthopodomyia

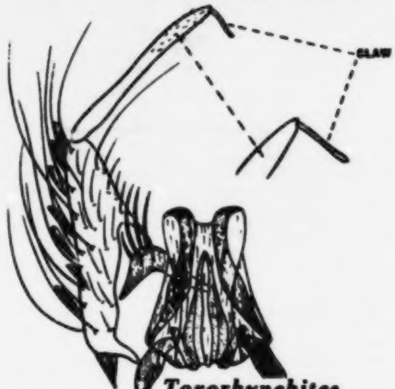
claw of dististyle not comb-like


DISTISTYLE
CLAW

SEE PART IV

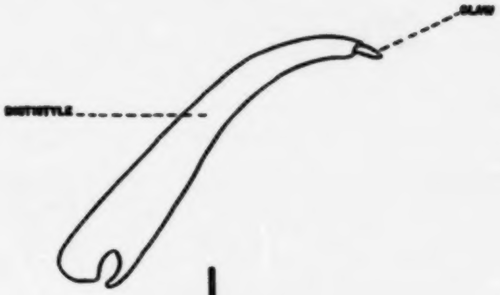
PART IV

claw of dististyle elongated

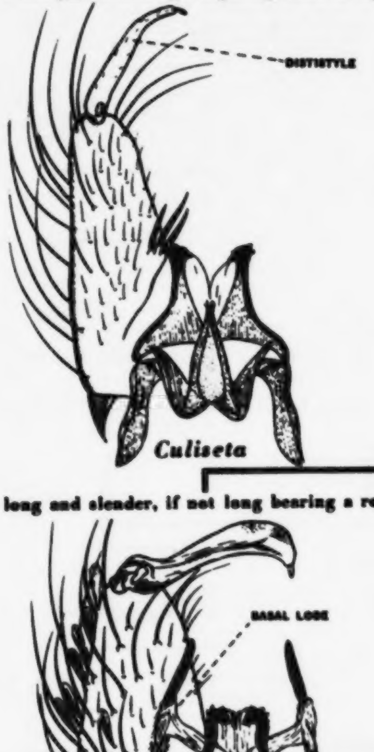


Toxorhynchites

claw of dististyle short

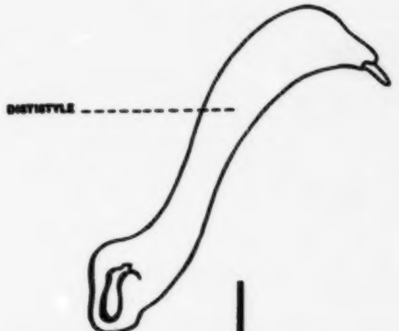

CLAW
DISTISTYLE

dististyle slender and tapering towards tip

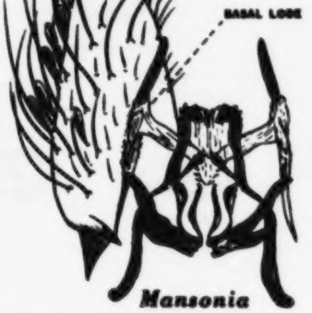

DISTISTYLE

Culiseta

dististyle stout

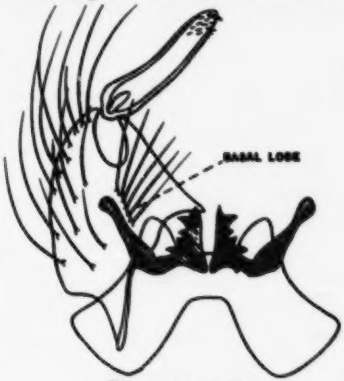

DISTISTYLE

basal lobe long and slender, if not long bearing a rod-like seta



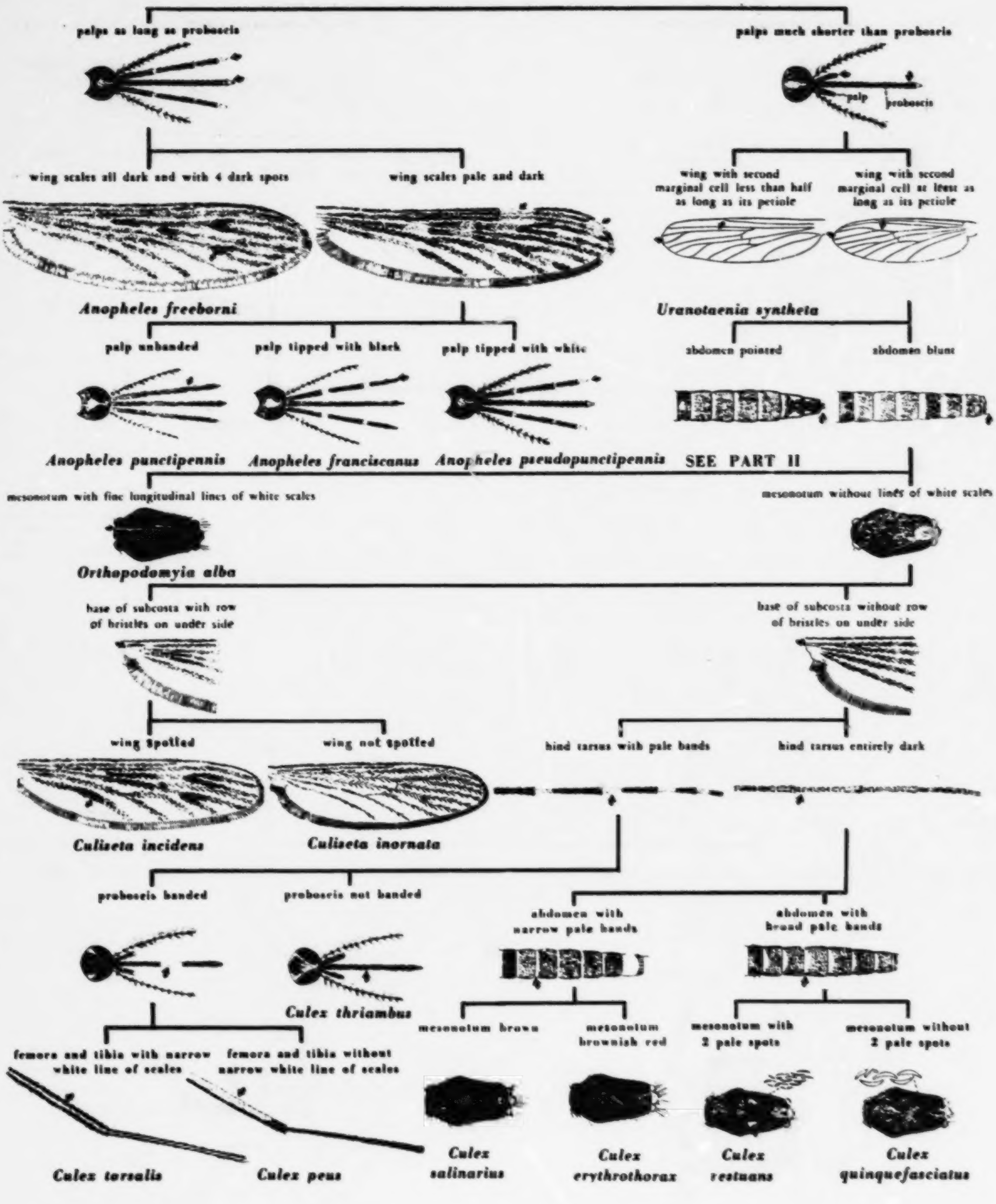
Mansonia

basal lobe not long and slender and without rod-like seta



Uranotaenia

MOSQUITOES: PICTORIAL KEY TO MOST ADULTS (FEMALE) OF NEW MEXICO
PART I
Chester J. Stojanovich


palps as long as proboscis
palps much shorter than proboscis
palp
proboscis
wing scales all dark and with 4 dark spots
wing scales pale and dark
wing with second marginal cell less than half as long as its petiole
wing with second marginal cell at least as long as its petiole
Anopheles freeborni
Uranotaenia syntheta
palp unbanded
palp tipped with black
palp tipped with white
abdomen pointed
abdomen blunt
Anopheles punctipennis
Anopheles franciscanus
Anopheles pseudopunctipennis
SEE PART II
mesonotum with fine longitudinal lines of white scales
mesonotum without lines of white scales
Orthopodomyia alba
base of subcosta with row of bristles on under side
base of subcosta without row of bristles on under side
wing spotted
wing not spotted
hind tarsus with pale bands
hind tarsus entirely dark
Culiseta incidens
Culiseta inornata
proboscis banded
proboscis not banded
abdomen with narrow pale bands
abdomen with broad pale bands
Culex thriambus
mesonotum brown
mesonotum brownish red
mesonotum with 2 pale spots
mesonotum without 2 pale spots
femora and tibia with narrow white line of scales
femora and tibia without narrow white line of scales
Culex tarsalis
Culex peus
Culex salinarius
Culex erythrothorax
Culex restuans
Culex quinquefasciatus

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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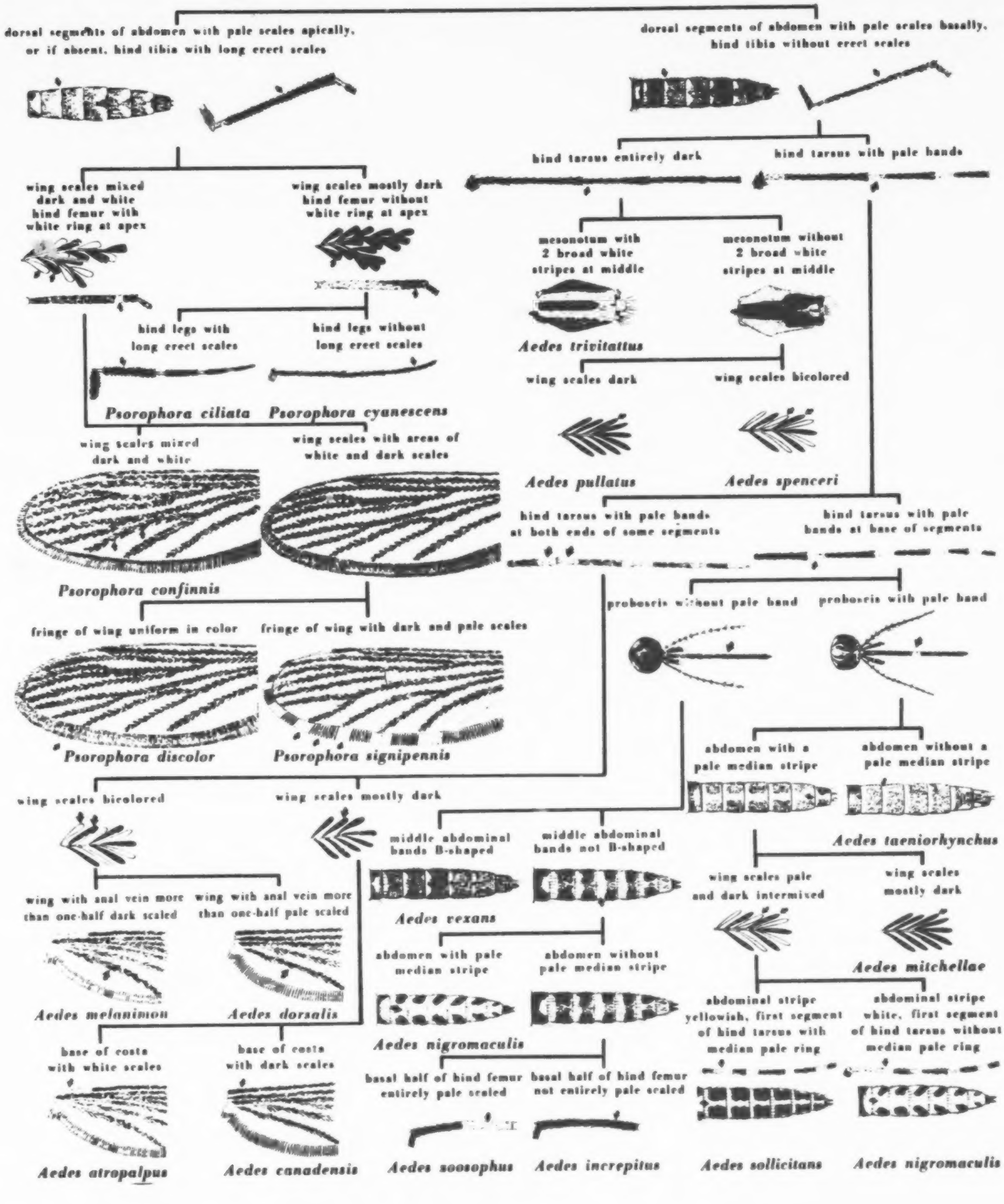
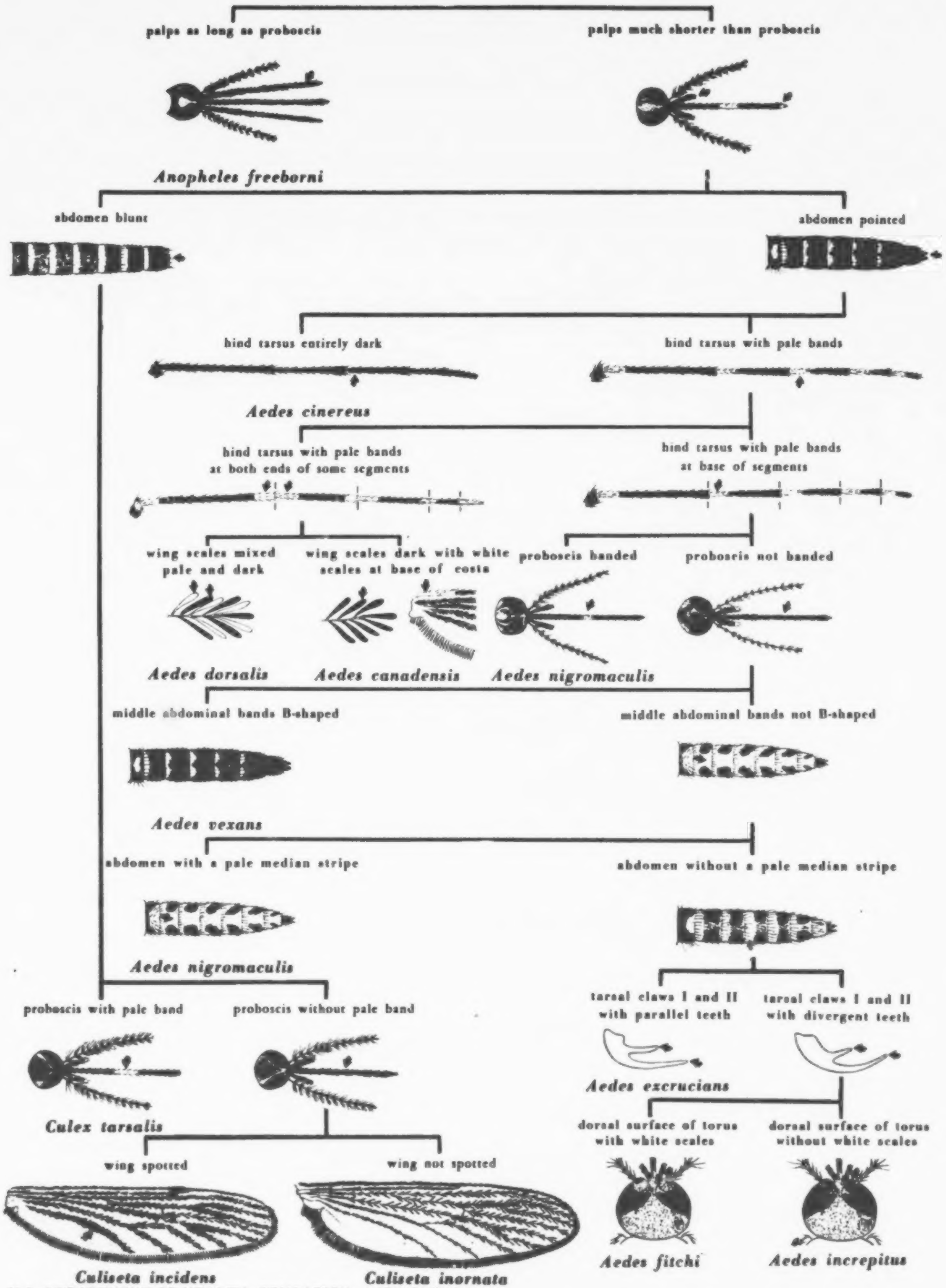
PART II


dorsal segments of abdomen with pale scales apically, or if absent, hind tibia with long erect scales
dorsal segments of abdomen with pale scales basally, hind tibia without erect scales
wing scales mixed dark and white hind femur with white ring at apex
wing scales mostly dark hind femur without white ring at apex
hind legs with long erect scales
hind legs without long erect scales
Psorophora ciliata
Psorophora cyanescens
wing scales mixed dark and white
wing scales with areas of white and dark scales
Psorophora confinnis
fringe of wing uniform in color
fringe of wing with dark and pale scales
Psorophora discolor
Psorophora signipennis
hind tarsus entirely dark
hind tarsus with pale bands
mesonotum with 2 broad white stripes at middle
mesonotum without 2 broad white stripes at middle
Aedes trivitattus
wing scales dark
wing scales bicolored
Aedes pullatus
Aedes spenceri
hind tarsus with pale bands at both ends of some segments
hind tarsus with pale bands at base of segments
proboscis without pale band
proboscis with pale band
abdomen with a pale median stripe
abdomen without a pale median stripe
Aedes taeniorhynchus
wing scales bicolored
wing scales mostly dark
wing with anal vein more than one-half dark scaled
wing with anal vein more than one-half pale scaled
Aedes melanimon
Aedes dorsalis
base of costa with white scales
base of costa with dark scales
Aedes atropalpus
Aedes canadensis
middle abdominal bands B-shaped
middle abdominal bands not B-shaped
Aedes vexans
abdomen with pale median stripe
abdomen without pale median stripe
Aedes nigromaculis
basal half of hind femur entirely pale scaled
basal half of hind femur not entirely pale scaled
Aedes zoosophus
Aedes increpitus
wing scales pale and dark intermixed
wing scales mostly dark
Aedes mitchellae
abdominal stripe yellowish, first segment of hind tarsus with median pale ring
abdominal stripe white, first segment of hind tarsus without median pale ring
Aedes sollicitans
Aedes nigromaculis

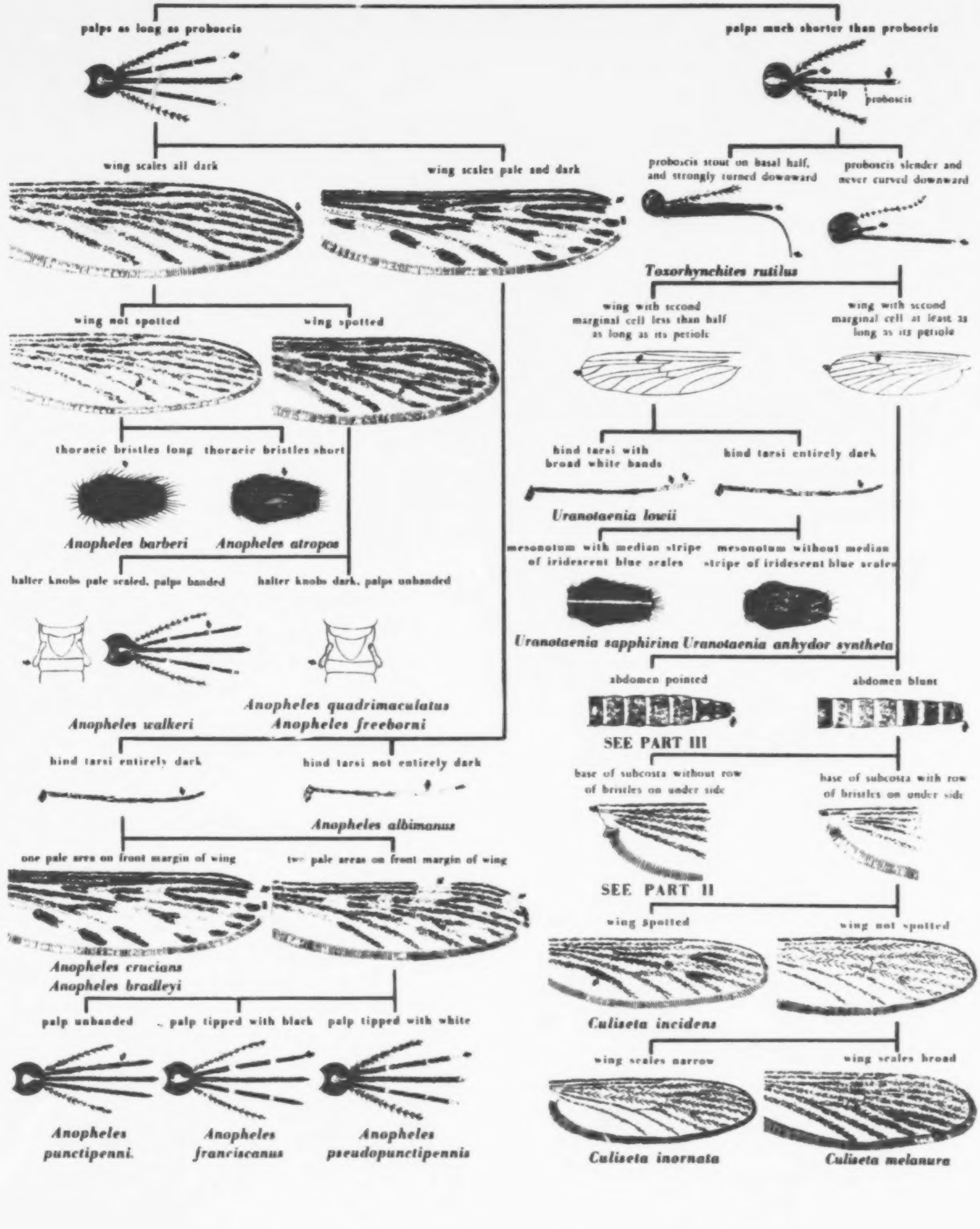
MOSQUITOES: PICTORIAL KEY TO SOME COMMON ADULTS (FEMALE) OF IDAHO

Chester J. Stojanovich


palps as long as proboscis
palps much shorter than proboscis
Anopheles freeborni
abdomen blunt
abdomen pointed
hind tarsus entirely dark
hind tarsus with pale bands
Aedes cinereus
hind tarsus with pale bands at both ends of some segments
hind tarsus with pale bands at base of segments
wing scales mixed pale and dark
wing scales dark with white scales at base of costa
proboscis banded
proboscis not banded
Aedes dorsalis
Aedes canadensis
Aedes nigromaculis
middle abdominal bands B-shaped
middle abdominal bands not B-shaped
Aedes vexans
abdomen with a pale median stripe
abdomen without a pale median stripe
Aedes nigromaculis
proboscis with pale band
proboscis without pale band
tarsal claws I and II with parallel teeth
tarsal claws I and II with divergent teeth
Culex tarsalis
Aedes excrucians
dorsal surface of torus with white scales
dorsal surface of torus without white scales
wing spotted
wing not spotted
Culiseta incidens
Culiseta inornata
Aedes fitchi
Aedes increpitus

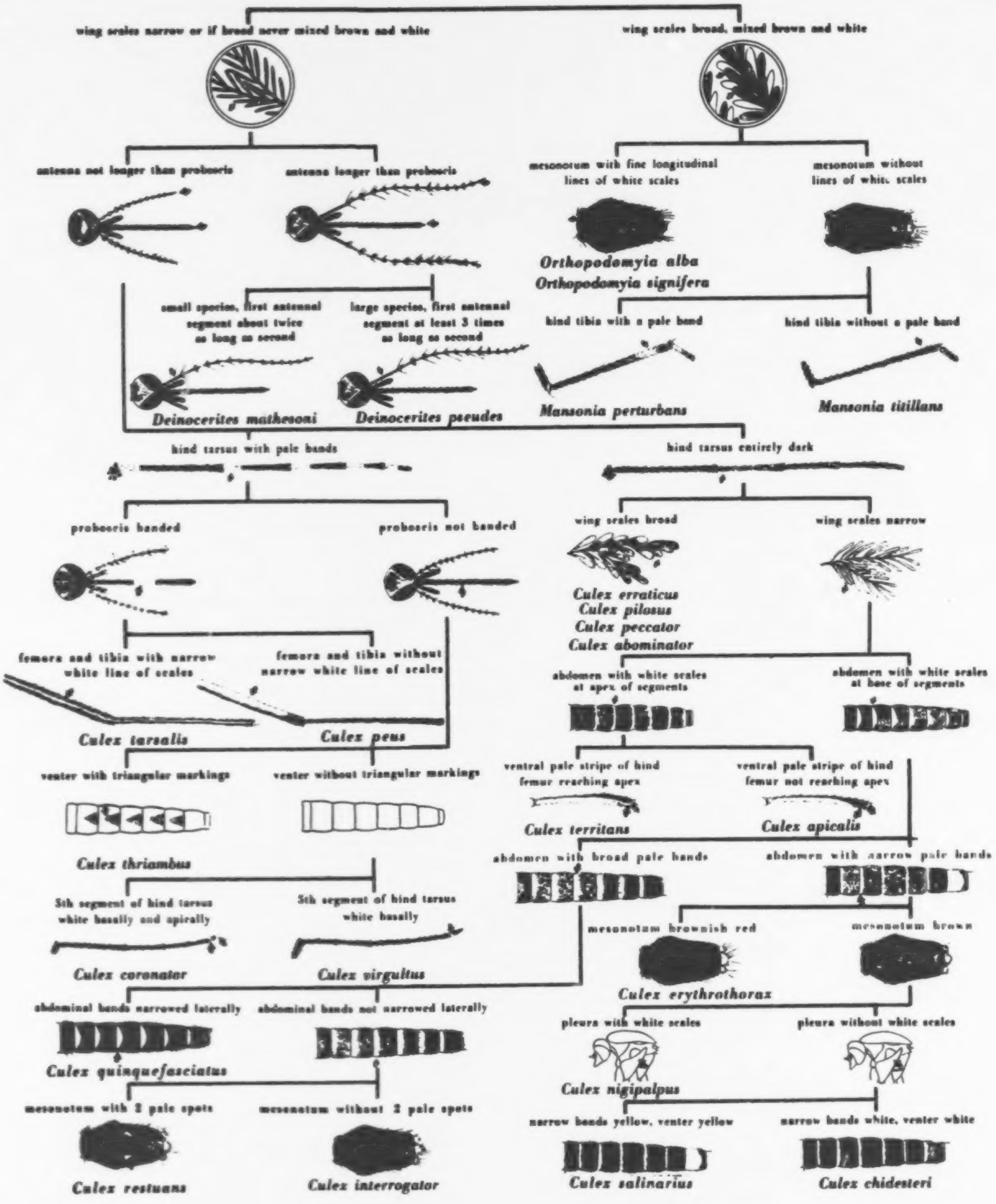
U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964

MOSQUITOES: PICTORIAL KEY TO ALL ADULTS (FEMALE) OF TEXAS
PART I
Chester J. Stojanovich

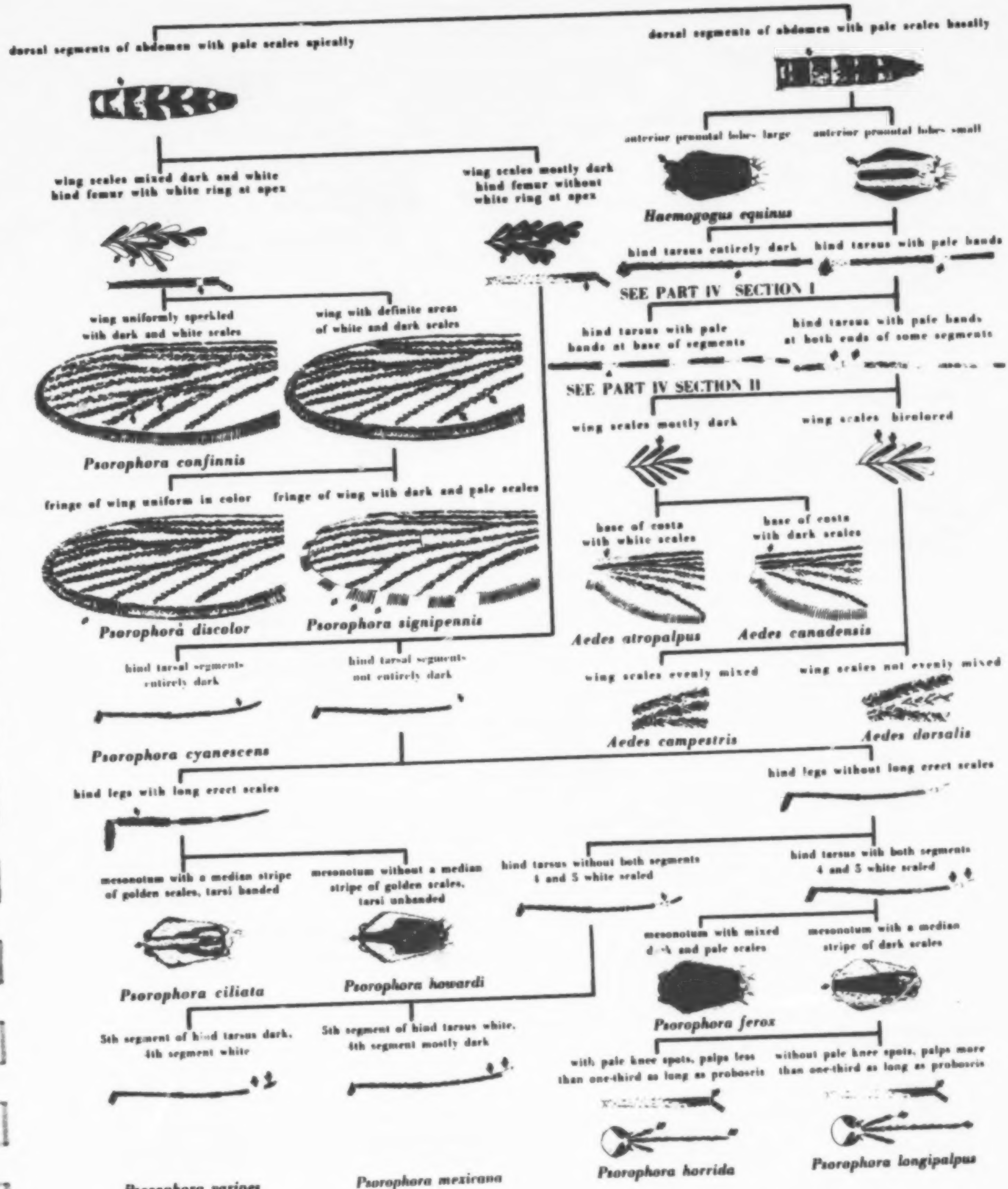

palps as long as proboscis
palps much shorter than proboscis
palp
proboscis
wing scales all dark
wing scales pale and dark
proboscis stout on basal half, and strongly turned downward
proboscis slender and never curved downward
Toxorhynchites rutilus
wing not spotted
wing spotted
wing with second marginal cell less than half as long as its petiole
wing with second marginal cell at least as long as its petiole
thoracic bristles long
thoracic bristles short
Anopheles barberi
Anopheles atropos
hind tarsi with broad white bands
hind tarsi entirely dark
Uranotaenia lowii
mesonotum with median stripe of iridescent blue scales
mesonotum without median stripe of iridescent blue scales
Uranotaenia sapphirina
Uranotaenia anhydor syntheta
halter knobs pale scaled, palps banded
halter knobs dark, palps unbanded
Anopheles walkeri
Anopheles quadrimaculatus
Anopheles freeborni
abdomen pointed
abdomen blunt
SEE PART III
hind tarsi entirely dark
hind tarsi not entirely dark
Anopheles albimanus
base of subcosta without row of bristles on under side
base of subcosta with row of bristles on under side
SEE PART II
one pale area on front margin of wing
two pale areas on front margin of wing
Anopheles crucians
Anopheles bradleyi
wing spotted
wing not spotted
Culiseta incidens
palp unbanded
palp tipped with black
palp tipped with white
wing scales narrow
wing scales broad
Anopheles punctipenni.
Anopheles franciscanus
Anopheles pseudopunctipennis
Culiseta inornata
Culiseta melanura

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964

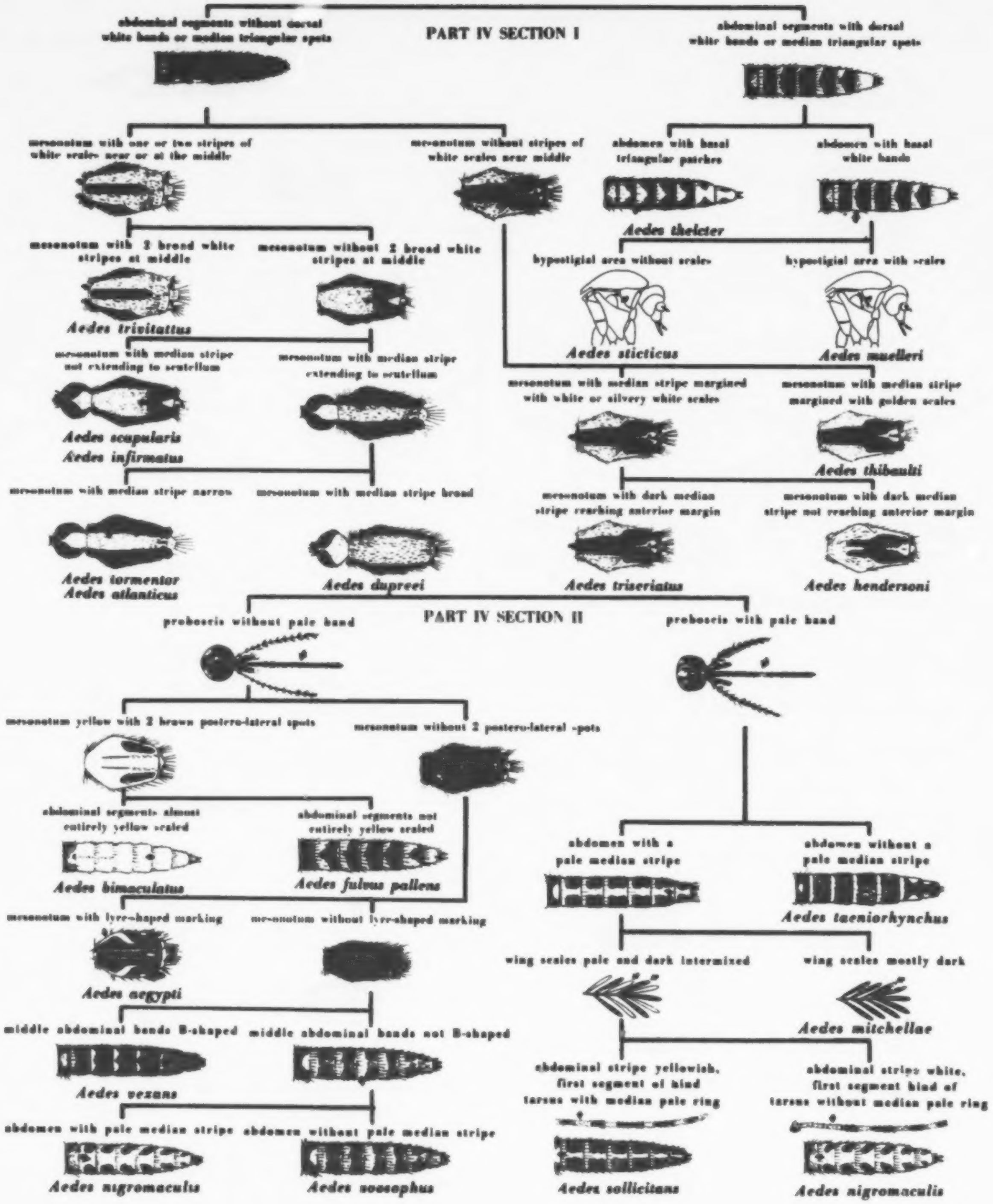
PART II


wing scales narrow or if broad never mixed brown and white
wing scales broad, mixed brown and white
antenna not longer than proboscis
antenna longer than proboscis
mesonotum with fine longitudinal lines of white scales
mesonotum without lines of white scales
Orthopodomyia alba
Orthopodomyia signifera
small species, first antennal segment about twice as long as second
large species, first antennal segment at least 3 times as long as second
hind tibia with a pale band
hind tibia without a pale band
Deinocerites mathesoni
Deinocerites pseudes
Mansonia perturbans
Mansonia titillans
hind tarsus with pale bands
hind tarsus entirely dark
proboscis banded
proboscis not banded
wing scales broad
wing scales narrow
Culex erraticus
Culex pilosus
Culex peccator
Culex abominator
femora and tibia with narrow white line of scales
femora and tibia without narrow white line of scales
abdomen with white scales at apex of segments
abdomen with white scales at base of segments
Culex tarsalis
Culex peus
venter with triangular markings
venter without triangular markings
ventral pale stripe of hind femur reaching apex
ventral pale stripe of hind femur not reaching apex
Culex territans
Culex apicalis
Culex thriambus
abdomen with broad pale bands
abdomen with narrow pale bands
5th segment of hind tarsus white basally and apically
5th segment of hind tarsus white basally
mesonotum brownish red
mesonotum brown
Culex coronator
Culex virgultus
Culex erythrothorax
abdominal bands narrowed laterally
abdominal bands not narrowed laterally
pleura with white scales
pleura without white scales
Culex quinquefasciatus
Culex nigripalpus
mesonotum with 2 pale spots
mesonotum without 2 pale spots
narrow bands yellow, venter yellow
narrow bands white, venter white
Culex restuans
Culex interrogator
Culex salinarius
Culex chidesteri

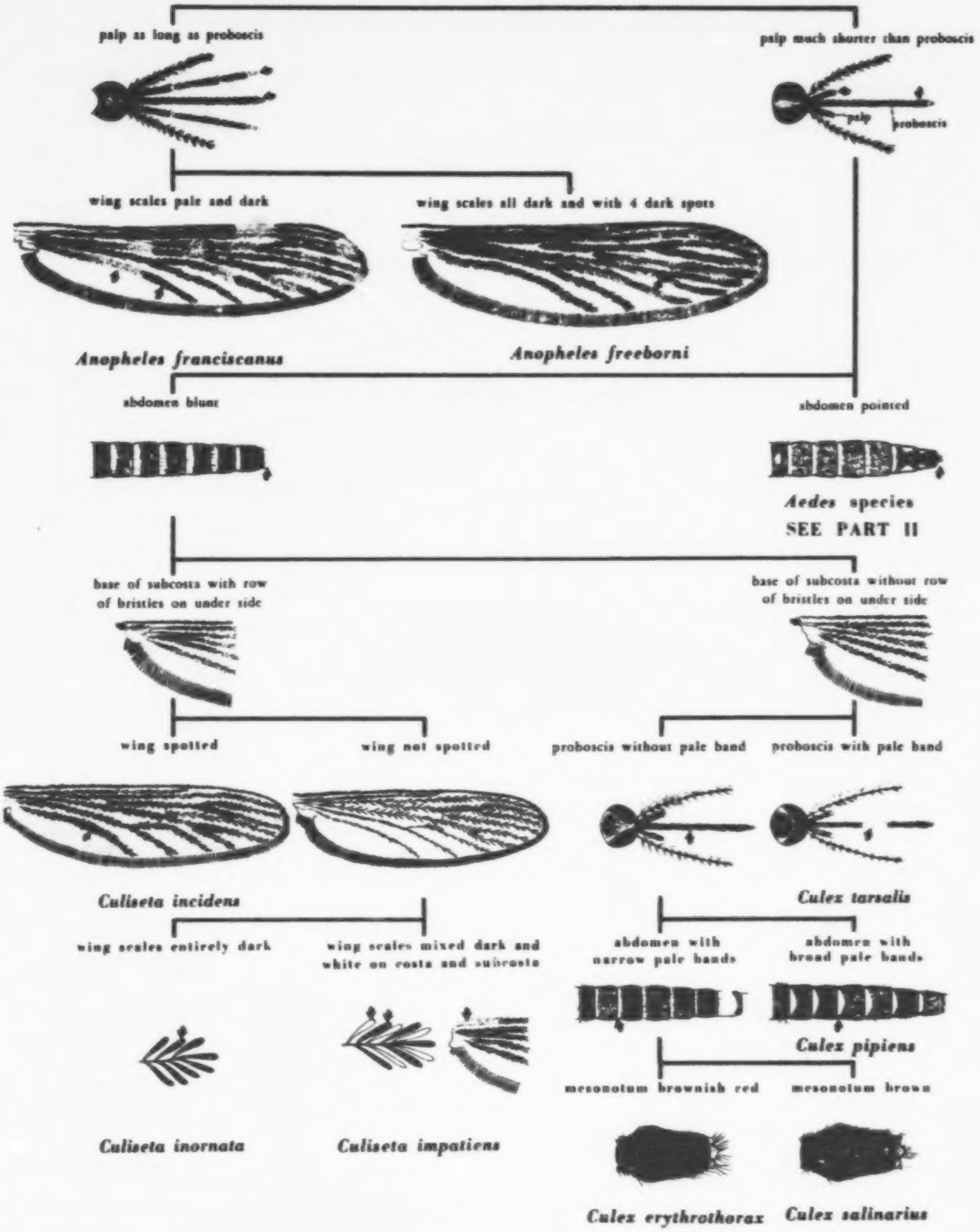
PART III


dorsal segments of abdomen with pale scales apically
dorsal segments of abdomen with pale scales basally
anterior pronotal lobes large
anterior pronotal lobes small
Haemogogus equinus
wing scales mixed dark and white
hind femur with white ring at apex
wing scales mostly dark
hind femur without
white ring at apex
hind tarsus entirely dark
hind tarsus with pale bands
SEE PART IV SECTION I
wing uniformly speckled
with dark and white scales
wing with definite areas
of white and dark scales
hind tarsus with pale
bands at base of segments
hind tarsus with pale bands
at both ends of some segments
SEE PART IV SECTION II
Psorophora confinnis
wing scales mostly dark
wing scales bicolored
fringe of wing uniform in color
fringe of wing with dark and pale scales
base of costa
with white scales
base of costa
with dark scales
Psorophora discolor
Psorophora signipennis
Aedes atropalpus
Aedes canadensis
hind tarsal segments
entirely dark
hind tarsal segments
not entirely dark
wing scales evenly mixed
wing scales not evenly mixed
Aedes campestris
Aedes dorsalis
Psorophora cyanescens
hind legs with long erect scales
hind legs without long erect scales
mesonotum with a median stripe
of golden scales, tarsi banded
mesonotum without a median
stripe of golden scales,
tarsi unbanded
hind tarsus without both segments
4 and 5 white scaled
hind tarsus with both segments
4 and 5 white scaled
mesonotum with mixed
dark and pale scales
mesonotum with a median
stripe of dark scales
Psorophora ciliata
Psorophora howardi
Psorophora ferox
5th segment of hind tarsus dark,
4th segment white
5th segment of hind tarsus white,
4th segment mostly dark
with pale knee spots, palps less
than one-third as long as proboscis
without pale knee spots, palps more
than one-third as long as proboscis
Psorophora horrida
Psorophora longipalpus
Psorophora varipes
Psorophora mexicana

PART IV


PART IV SECTION I
abdominal segments without dorsal white bands or median triangular spots
abdominal segments with dorsal white bands or median triangular spots
mesonotum with one or two stripes of white scales near or at the middle
mesonotum without stripes of white scales near middle
abdomen with basal triangular patches
abdomen with basal white bands
Aedes thelcter
mesonotum with 2 broad white stripes at middle
mesonotum without 2 broad white stripes at middle
hypostigial area without scales
hypostigial area with scales
Aedes trivittatus
Aedes sticticus
Aedes muelleri
mesonotum with median stripe not extending to scutellum
mesonotum with median stripe extending to scutellum
mesonotum with median stripe margined with white or silvery white scales
mesonotum with median stripe margined with golden scales
Aedes scapularis
Aedes infirmatus
Aedes thibaulti
mesonotum with median stripe narrow
mesonotum with median stripe broad
mesonotum with dark median stripe reaching anterior margin
mesonotum with dark median stripe not reaching anterior margin
Aedes tormentor
Aedes atlanticus
Aedes dupreei
Aedes triseriatus
Aedes hendersoni
PART IV SECTION II
proboscis without pale band
proboscis with pale band
mesonotum yellow with 2 brown postero-lateral spots
mesonotum without 2 postero-lateral spots
abdominal segments almost entirely yellow scaled
abdominal segments not entirely yellow scaled
Aedes bimaculatus
Aedes fulvus pallens
abdomen with a pale median stripe
abdomen without a pale median stripe
Aedes taeniorhynchus
mesonotum with lyre-shaped marking
mesonotum without lyre-shaped marking
Aedes aegypti
wing scales pale and dark intermixed
wing scales mostly dark
Aedes mitchellae
middle abdominal bands B-shaped
middle abdominal bands not B-shaped
Aedes vexans
abdominal stripe yellowish, first segment of hind tarsus with median pale ring
abdominal stripe white, first segment hind of tarsus without median pale ring
abdomen with pale median stripe
abdomen without pale median stripe
Aedes nigromaculis
Aedes soosophus
Aedes sollicitans
Aedes nigromaculis

MOSQUITOES: PICTORIAL KEY TO SOME COMMON ADULTS (FEMALE) OF UTAH
PART I
Chester J. Stojanovich


palp as long as proboscis
palp much shorter than proboscis
palp
proboscis
wing scales pale and dark
wing scales all dark and with 4 dark spots
Anopheles franciscanus
Anopheles freeborni
abdomen blunt
abdomen pointed
Aedes species
SEE PART II
base of subcosta with row of bristles on under side
base of subcosta without row of bristles on under side
wing spotted
wing not spotted
proboscis without pale band
proboscis with pale band
Culiseta incidens
Culex tarsalis
wing scales entirely dark
wing scales mixed dark and white on costa and subcosta
abdomen with narrow pale bands
abdomen with broad pale bands
Culex pipiens
mesonotum brownish red
mesonotum brown
Culiseta inornata
Culiseta impatiens
Culex erythrothorax
Culex salinarius

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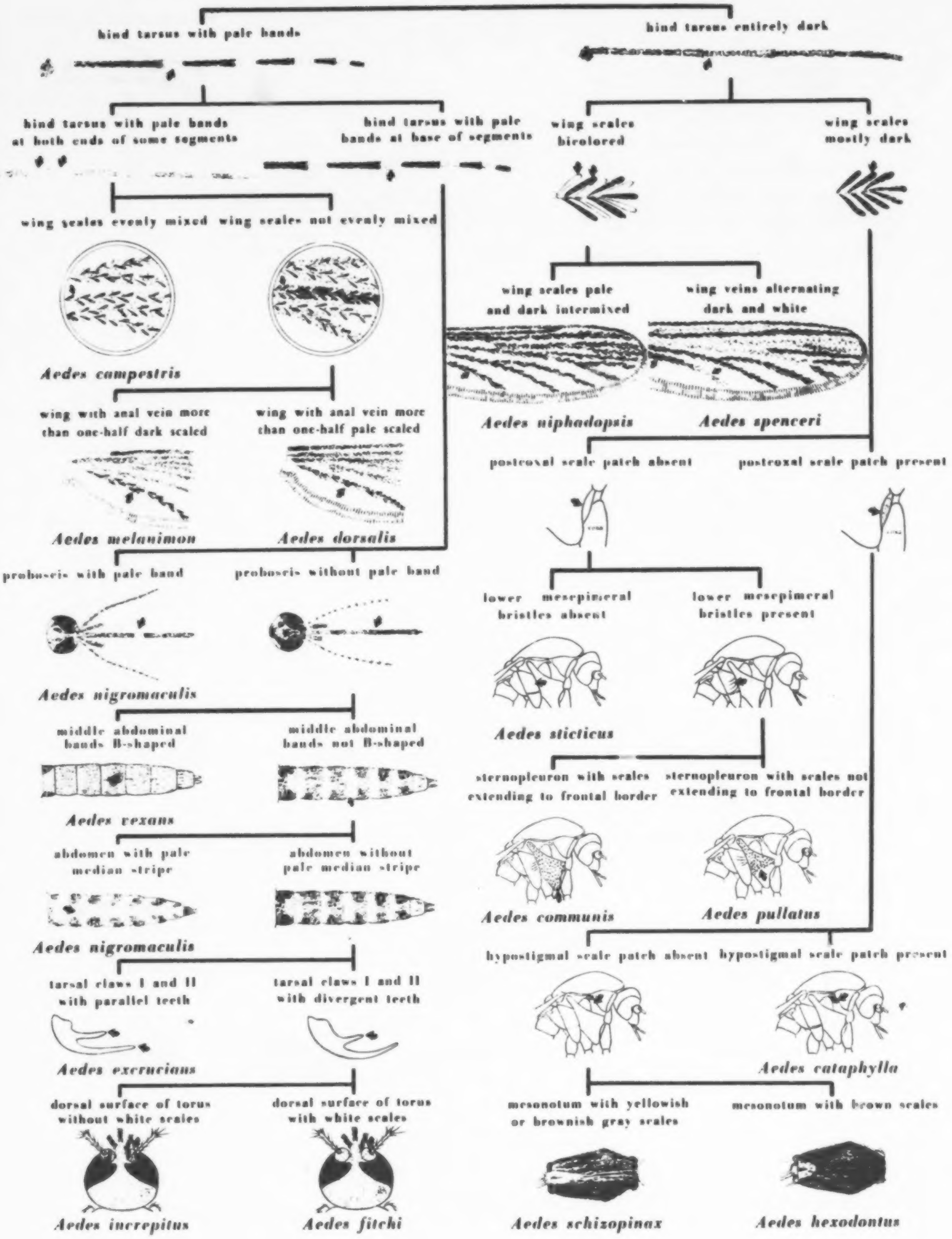
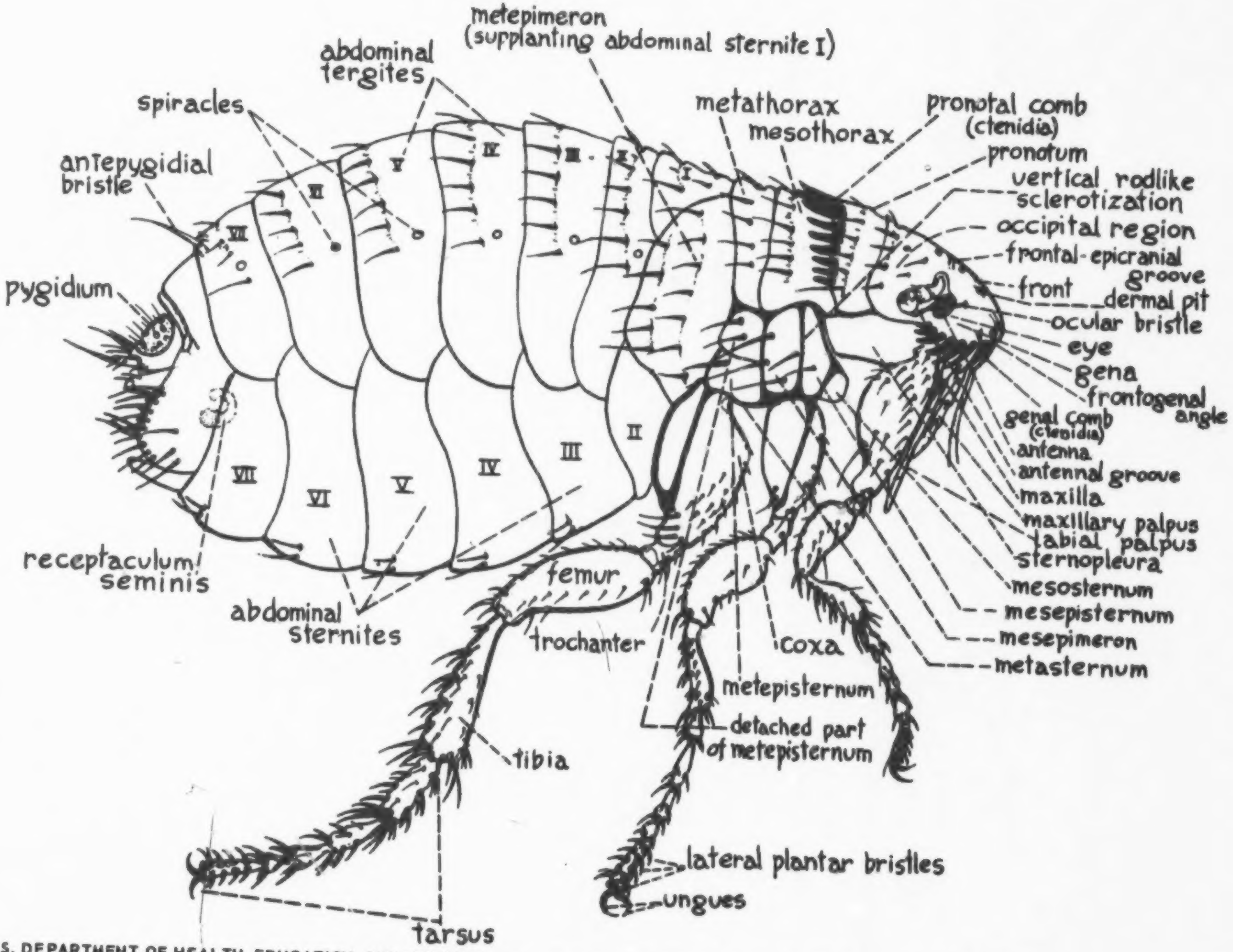
PART II


hind tarsus with pale bands
hind tarsus entirely dark
hind tarsus with pale bands at both ends of some segments
hind tarsus with pale bands at base of segments
wing scales bicolored
wing scales mostly dark
wing scales evenly mixed
wing scales not evenly mixed
Aedes campestris
wing scales pale and dark intermixed
wing veins alternating dark and white
Aedes niphadopsis
Aedes spenceri
wing with anal vein more than one-half dark scaled
wing with anal vein more than one-half pale scaled
Aedes melanimon
Aedes dorsalis
postcoxal scale patch absent
postcoxal scale patch present
proboscis with pale band
proboscis without pale band
Aedes nigromaculis
lower mesepimeral bristles absent
lower mesepimeral bristles present
Aedes sticticus
middle abdominal bands B-shaped
middle abdominal bands not B-shaped
Aedes vexans
sternopleuron with scales extending to frontal border
sternopleuron with scales not extending to frontal border
abdomen with pale median stripe
abdomen without pale median stripe
Aedes communis
Aedes pullatus
Aedes nigromaculis
hypostigmal scale patch absent
hypostigmal scale patch present
tarsal claws I and II with parallel teeth
tarsal claws I and II with divergent teeth
Aedes excrucians
Aedes cataphylla
dorsal surface of torus without white scales
dorsal surface of torus with white scales
mesonotum with yellowish or brownish gray scales
mesonotum with brown scales
Aedes increpitus
Aedes fitchi
Aedes schizopinax
Aedes hexodontus

CAT FLEA – CTENOCEPHALIDES FELIS

adult female


metepimeron (supplanting abdominal sternite I)
abdominal tergites
spiracles
antepygidial bristle
pygidium
metathorax
mesothorax
pronotal comb (ctenidia)
pronotum
vertical rodlike sclerotization
occipital region
frontal-epicranial groove
front
dermal pit
ocular bristle
eye
gena
frontogenal angle
genal comb (ctenidia)
antenna
antennal groove
maxilla
maxillary palpus
labial palpus
sternopleura
mesosternum
mesepisternum
mesepimeron
metasternum
I
II
III
IV
V
VI
VII
receptaculum seminis
abdominal sternites
femur
trochanter
coxa
metepisternum
detached part of metepisternum
tibia
lateral plantar bristles
ungues
tarsus

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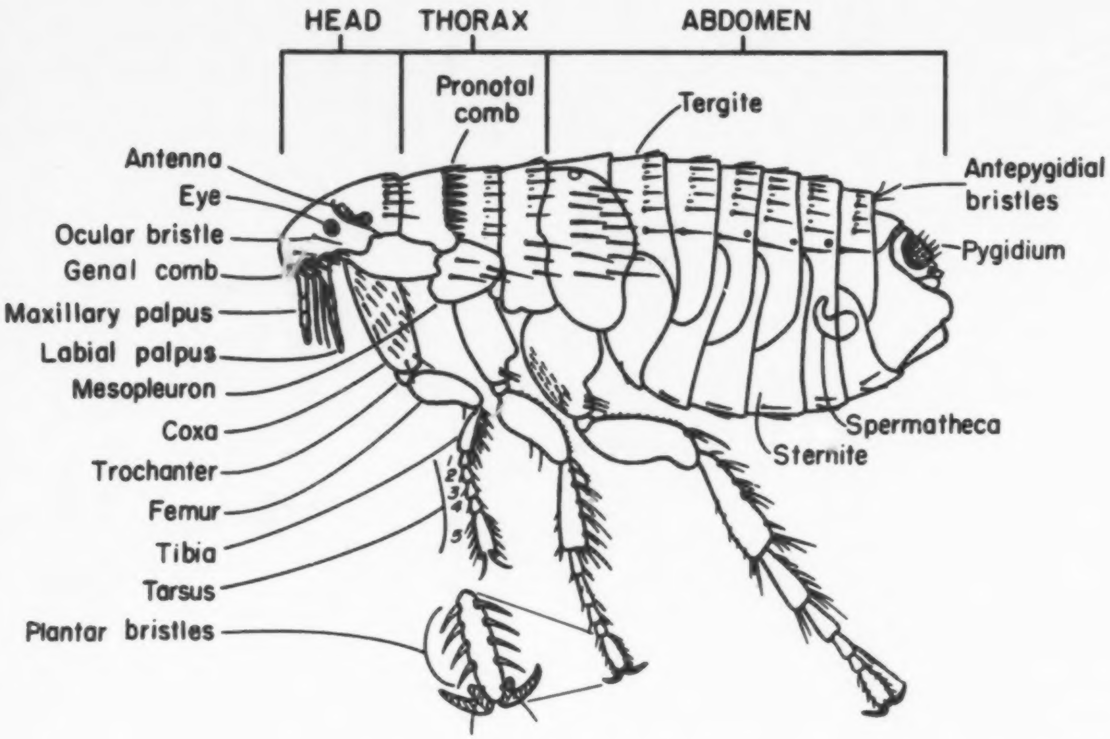
FLEA DIAGRAM – WITH STRUCTURES LABELED

Harry D. Pratt


HEAD
THORAX
ABDOMEN
Pronotal comb
Tergite
Antenna
Eye
Ocular bristle
Genal comb
Maxillary palpus
Labial palpus
Mesopleuron
Coxa
Trochanter
Femur
Tibia
Tarsus
Plantar bristles
1
2
3
4
5
Antepygidial bristles
Pygidium
Spermatheca
Sternite

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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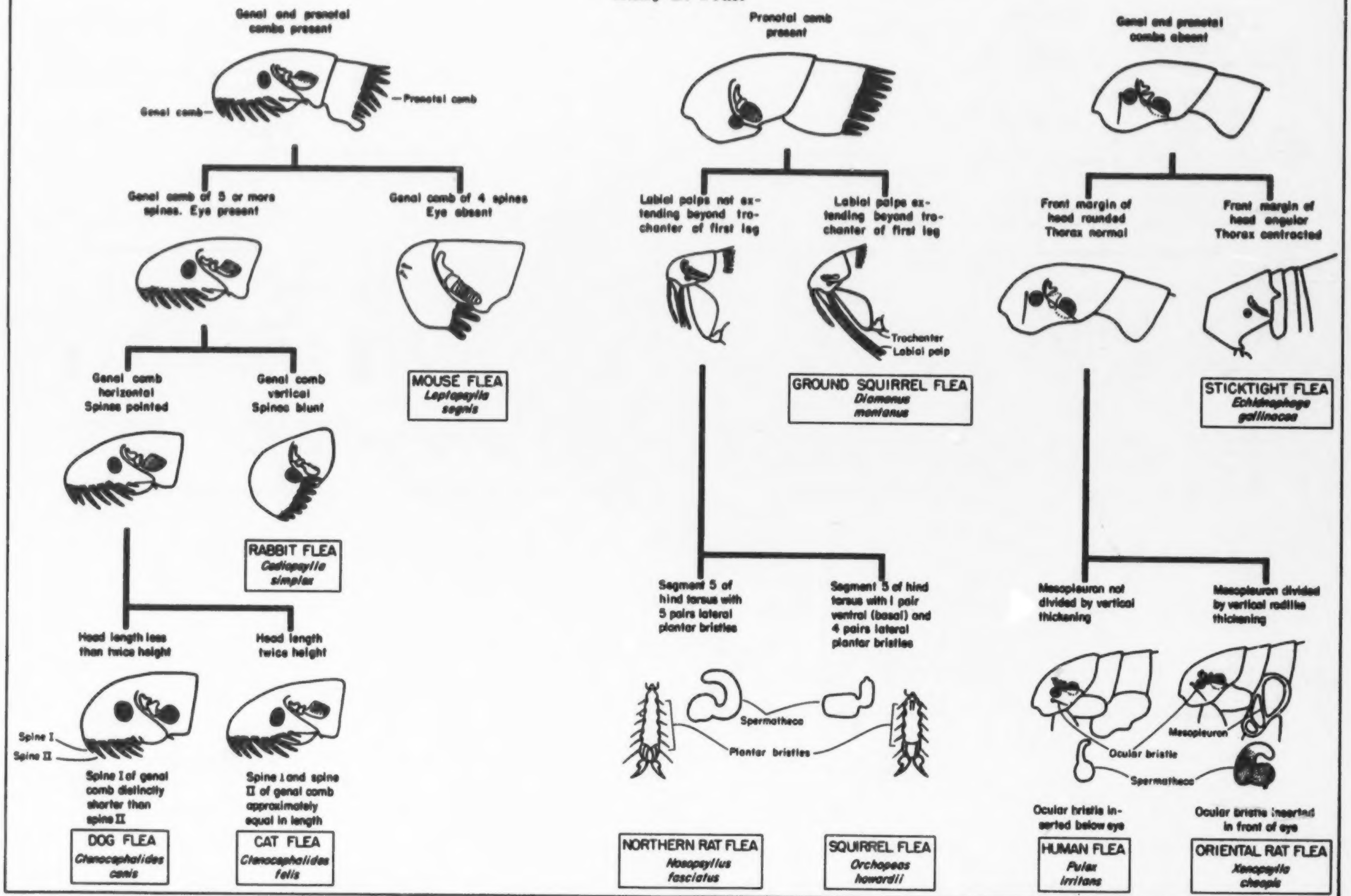
FLEAS: PICTORIAL KEY TO SOME COMMON SPECIES IN THE UNITED STATES

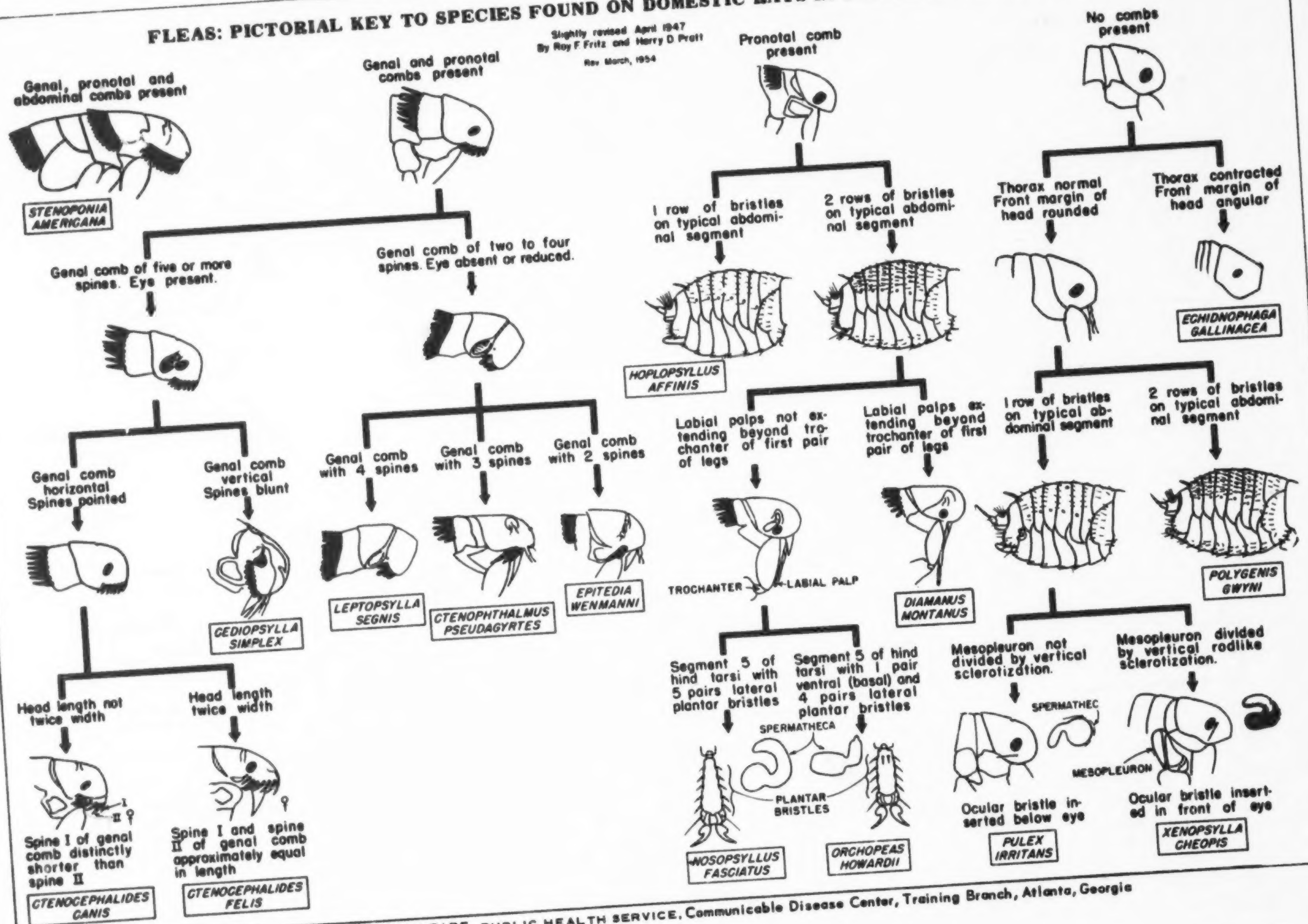
Harry D. Pratt


Genal and pronotal combs present
Genal comb
Pronotal comb
Genal comb of 5 or more spines. Eye present
Genal comb of 4 spines Eye absent
MOUSE FLEA
Leptopsylla segnis
Genal comb horizontal Spines pointed
Genal comb vertical Spines blunt
RABBIT FLEA
Cediopsylla simplex
Head length less than twice height
Head length twice height
Spine I
Spine II
Spine I of genal comb distinctly shorter than spine II
Spine I and spine II of genal comb approximately equal in length
DOG FLEA
Ctenocephalides canis
CAT FLEA
Ctenocephalides felis
Pronotal comb present
Labial palps not extending beyond trochanter of first leg
Labial palps extending beyond trochanter of first leg
Trochanter
Labial palp
GROUND SQUIRREL FLEA
Diamanus montanus
Segment 5 of hind tarsus with 5 pairs lateral plantar bristles
Segment 5 of hind tarsus with 1 pair ventral (basal) and 4 pairs lateral plantar bristles
Spermatheca
Plantar bristles
NORTHERN RAT FLEA
Nosopsyllus fasciatus
SQUIRREL FLEA
Orchopeas howardii
Genal and pronotal combs absent
Front margin of head rounded Thorax normal
Front margin of head angular Thorax contracted
STICKTIGHT FLEA
Echidnophaga gallinacea
Mesopleuron not divided by vertical thickening
Mesopleuron divided by vertical rodlike thickening
Mesopleuron
Ocular bristle
Spermatheca
Ocular bristle inserted below eye
Ocular bristle inserted in front of eye
HUMAN FLEA
Pulex irritans
ORIENTAL RAT FLEA
Xenopsylla cheopis

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1956

FLEAS: PICTORIAL KEY TO SPECIES FOUND ON DOMESTIC RATS IN SOUTHERN UNITED STATES

Slightly revised April 1947
By Roy F Fritz and Harry D Pratt
Rev March, 1954


Genal, pronotal and abdominal combs present
STENOPONIA AMERICANA
Genal and pronotal combs present
Genal comb of five or more spines. Eye present.
Genal comb horizontal Spines pointed
Head length not twice width
Spine I of genal comb distinctly shorter than spine II
I
II
♀
CTENOCEPHALIDES CANIS
Head length twice width
Spine I and spine II of genal comb approximately equal in length
♀
CTENOCEPHALIDES FELIS
Genal comb vertical Spines blunt
CEDIOPSYLLA SIMPLEX
Genal comb of two to four spines. Eye absent or reduced.
Genal comb with 4 spines
LEPTOPSYLLA SEGNIS
Genal comb with 3 spines
CTENOPHTHALMUS PSEUDAGYRTES
Genal comb with 2 spines
EPITEDIA WENMANNI
Pronotal comb present
I row of bristles on typical abdominal segment
HOPLOPSYLLUS AFFINIS
2 rows of bristles on typical abdominal segment
Labial palps not extending beyond trochanter of first pair of legs
TROCHANTER
LABIAL PALP
Segment 5 of hind tarsi with 5 pairs lateral plantar bristles
NOSOPSYLLUS FASCIATUS
SPERMATHECA
PLANTAR BRISTLES
Segment 5 of hind tarsi with 1 pair ventral (basal) and 4 pairs lateral plantar bristles
ORCHOPEAS HOWARDII
Labial palps extending beyond trochanter of first pair of legs
DIAMANUS MONTANUS
No combs present
Thorax normal Front margin of head rounded
I row of bristles on typical abdominal segment
Mesopleuron not divided by vertical sclerotization.
SPERMATHEC
Ocular bristle inserted below eye
PULEX IRRITANS
Mesopleuron divided by vertical rodlike sclerotization.
MESOPLEURON
Ocular bristle inserted in front of eye
XENOPSYLLA CHEOPIS
2 rows of bristles on typical abdominal segment
POLYGENIS GWYNI
Thorax contracted Front margin of head angular
ECHIDNOPHAGA GALLINACEA

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE, PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia

FLEAS: ILLUSTRATED KEY TO SPECIES FOUND DURING PLAGUE INVESTIGATIONS

Harry D. Pratt and Chester J. Stojanovich

1. Pronotal and genal combs absent (Fig. 1 A)............................2

   Pronotal combs present; genal comb present or absent (Fig. 1 B & C)...5

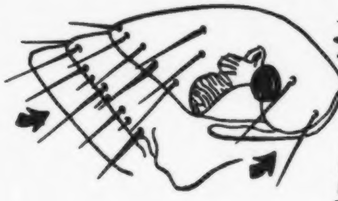


Fig. 1 A

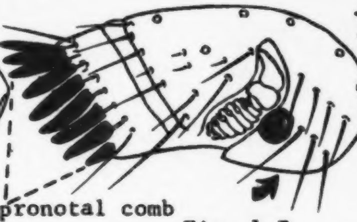


Fig. 1 B

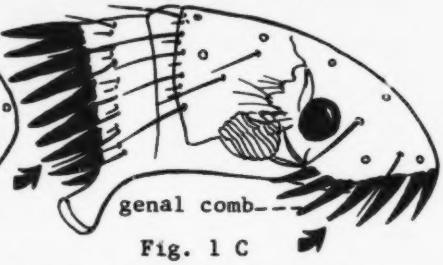


Fig. 1 C

2. Front margin of head with two angles; three thoracic tergites together shorter than the first abdominal tergite (Fig. 2 A). (Echidnophaga gallinacea)....................................STICKTIGHT FLEA

   Front margin of head rounded; three thoracic tergites together longer than the first abdominal tergite (Fig. 2 B).........................3

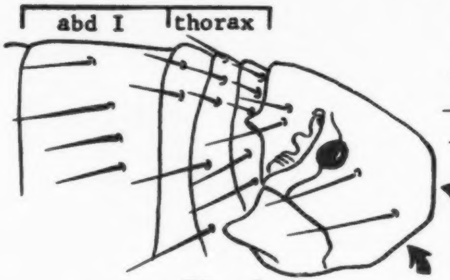


Fig. 2 A

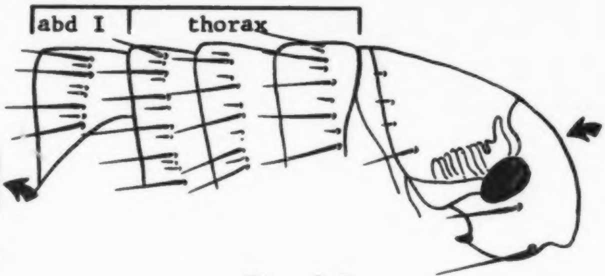


Fig. 2 B

3. Ocular bristle in front of eye; mesopleuron divided by internal sclerotization; female with spermatheca partially pigmented (Fig. 3 A & B)... ....(Genus Xenopsylla).........4

   Ocular bristle beneath eye; mesopleuron without internal sclerotization; female with spermatheca entirely without pigment (Fig. 3 C & D)........ (Pulex irritans)..HUMAN FLEA

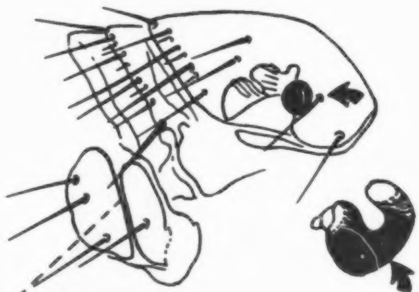


Fig. 3 A

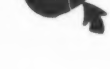


Fig. 3 B

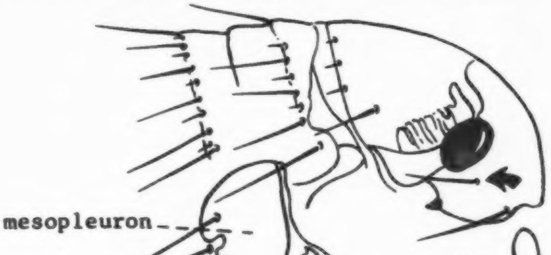


Fig. 3 C

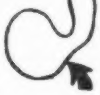


Fig. 3 D

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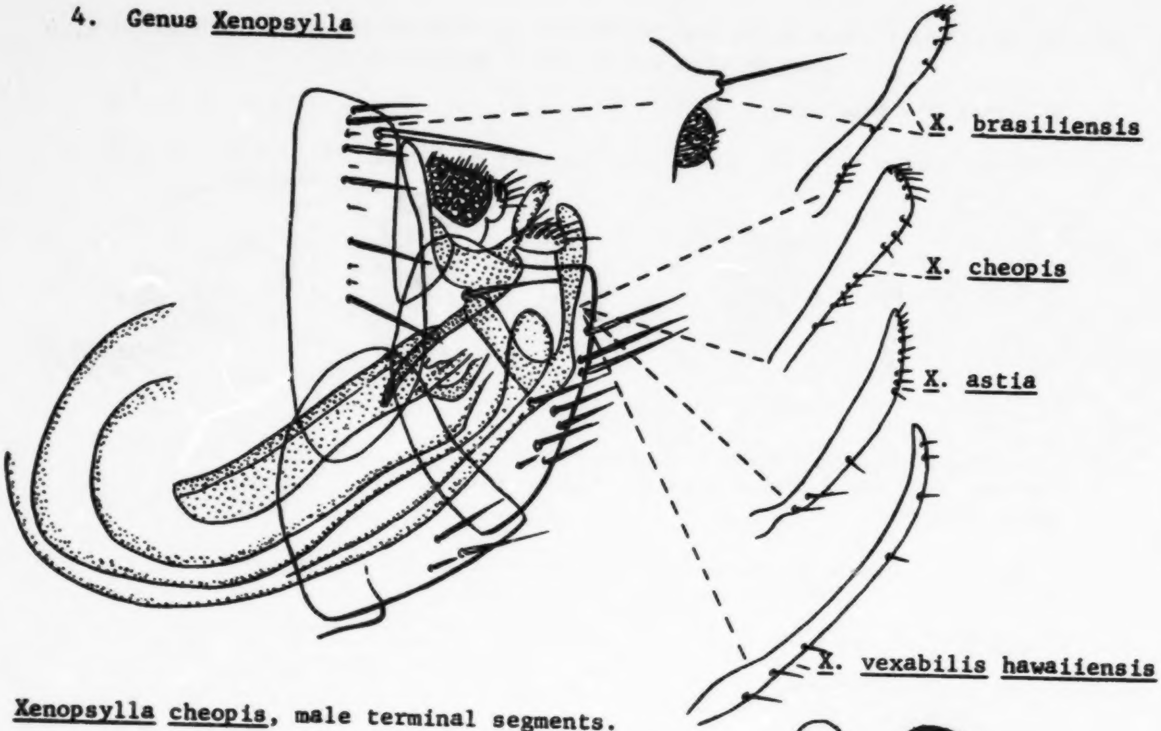
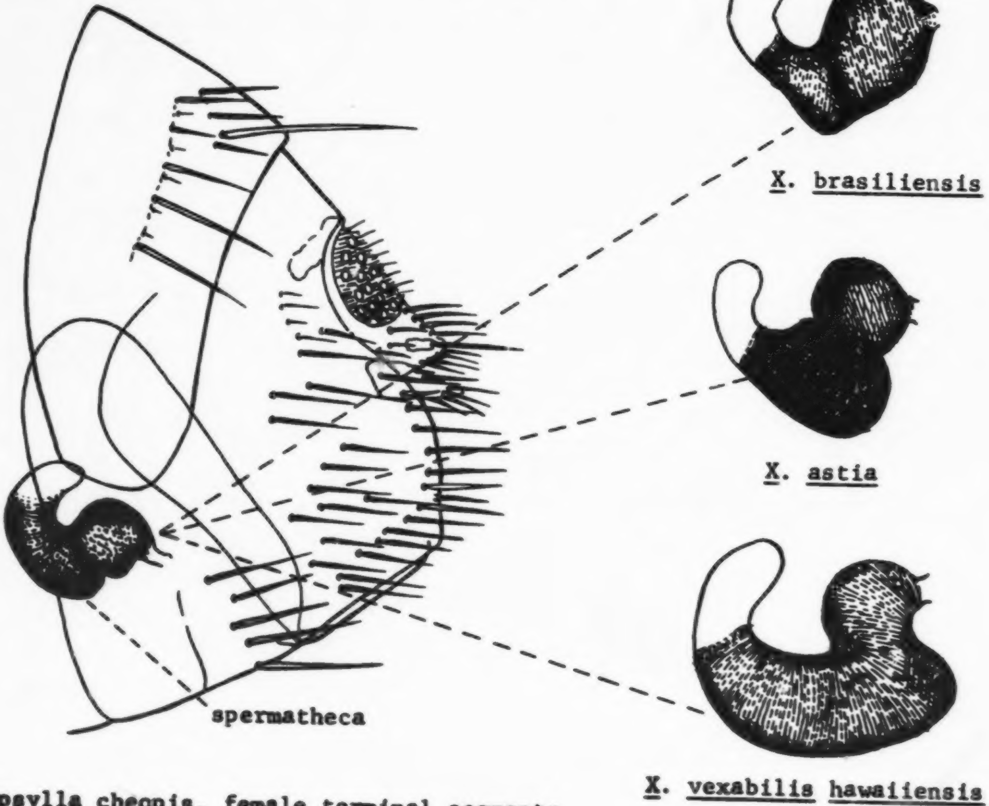
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1960

4. Genus Xenopsylla


X. brasiliensis
X. cheopis
X. astia
X. vexabilis hawaiiensis

Xenopsylla cheopis, male terminal segments.


X. brasiliensis
X. astia
spermatheca
X. vexabilis hawaiiensis

Xenopsylla cheopis, female terminal segments

5. Genal comb absent (Fig. 5 A)..6

Genal comb present (Fig. 5 B)..8

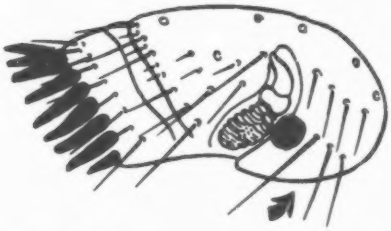


Fig. 5 A

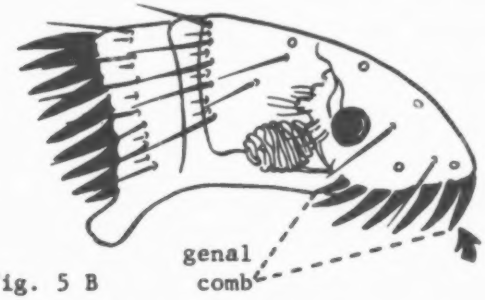


Fig. 5 B

6. Pronotal comb with about 12 teeth on each side (Fig. 6 A). India....... .... Stivalius ahalae

Pronotal comb with 5 to 10 teeth on each side (Fig. 6 B)...............7

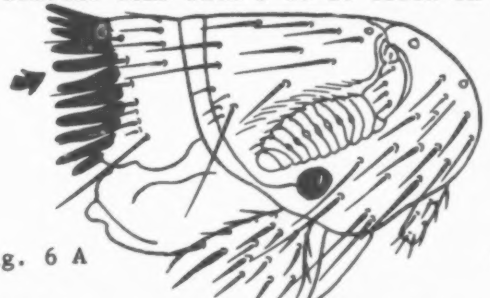


Fig. 6 A

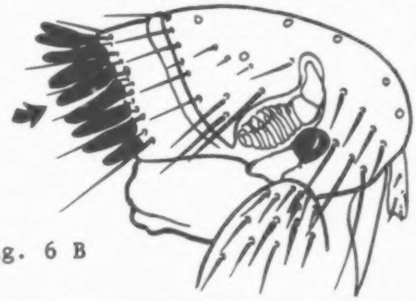


Fig. 6 B

7. Labial palpus long, extending beyond trochanter of first leg (Fig. 7 A). Diamanus montanus..................................ROCK SQUIRREL FLEA

Labial palpus short, not extending to tip of coxa of first leg (Fig. 7 B). Nosopsyllus fasciatus..............................NORTHERN RAT FLEA

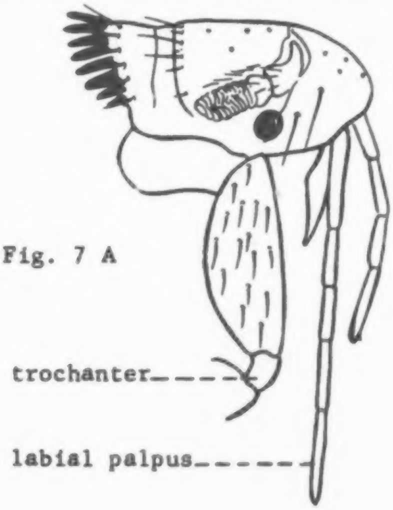

trochanter
labial palpus

Fig. 7 A

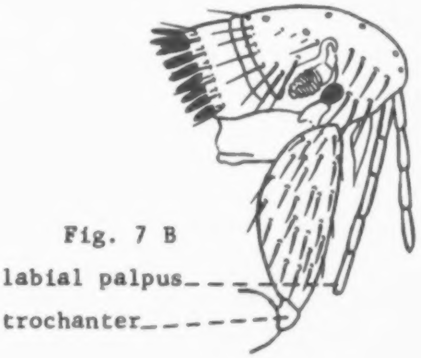

labial palpus
trochanter

Fig. 7 B

8. Genal comb with two teeth (Fig. 8 A)....................(Genus *Neopsylla*)
Neopsylla setosa important in U. S. S. R., Mongolia and Manchuria.

Genal comb with three teeth (Fig. 8 B).............(Genus *Ctenophthalmus*)
Ctenophthalmus breviatus and *pollex* potential vectors in U. S. S. R.

Genal comb with four teeth (Fig. 8 C).................(Genus *Leptopsylla*)
Leptopsylla segnis is cosmopolitan.

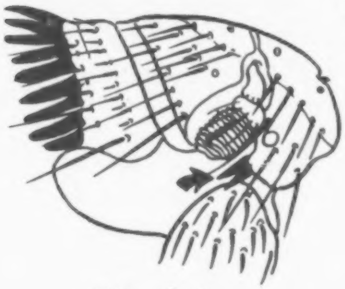


Fig. 8 A

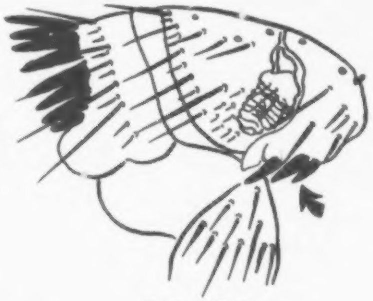


Fig. 8 B

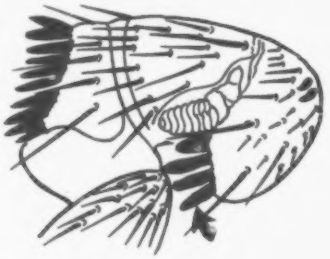


Fig. 8 C

Genal comb with more than five teeth.............(Genus *Ctenocephalides*). 9

9. Head strongly rounded anteriorly; first spine of genal comb about half as long as second; hind tibia with the spiniform setae A and B (Fig. 9 A & B).
Ctenocephalides canis...DOG FLEA

Head not strongly convex anteriorly; first spine of genal comb almost as long as second spine; hind tibia with spiniform seta B, spiniform seta A replaced by a minute seta which may be absent in some specimens (Fig. 9 C & D). *Ctenocephalides felis*.................................CAT FLEA

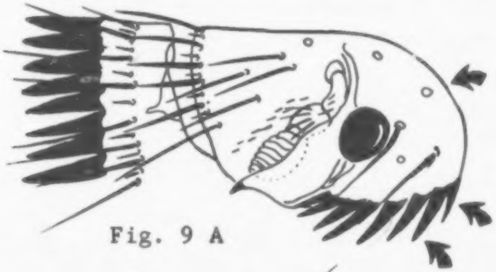


Fig. 9 A

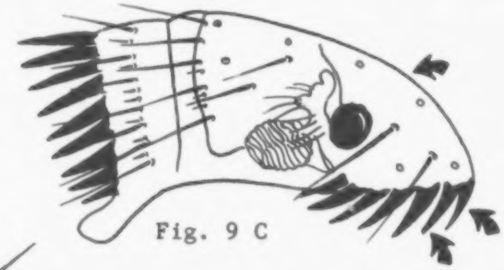


Fig. 9 C

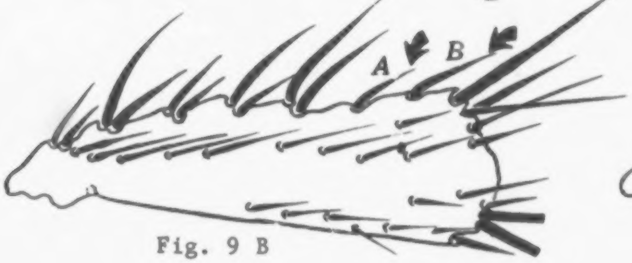


Fig. 9 B

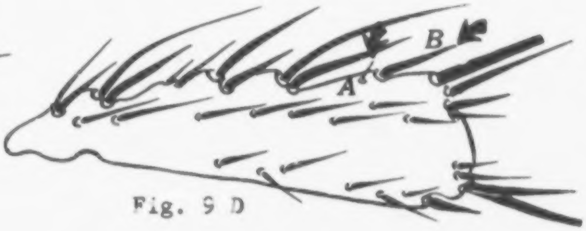
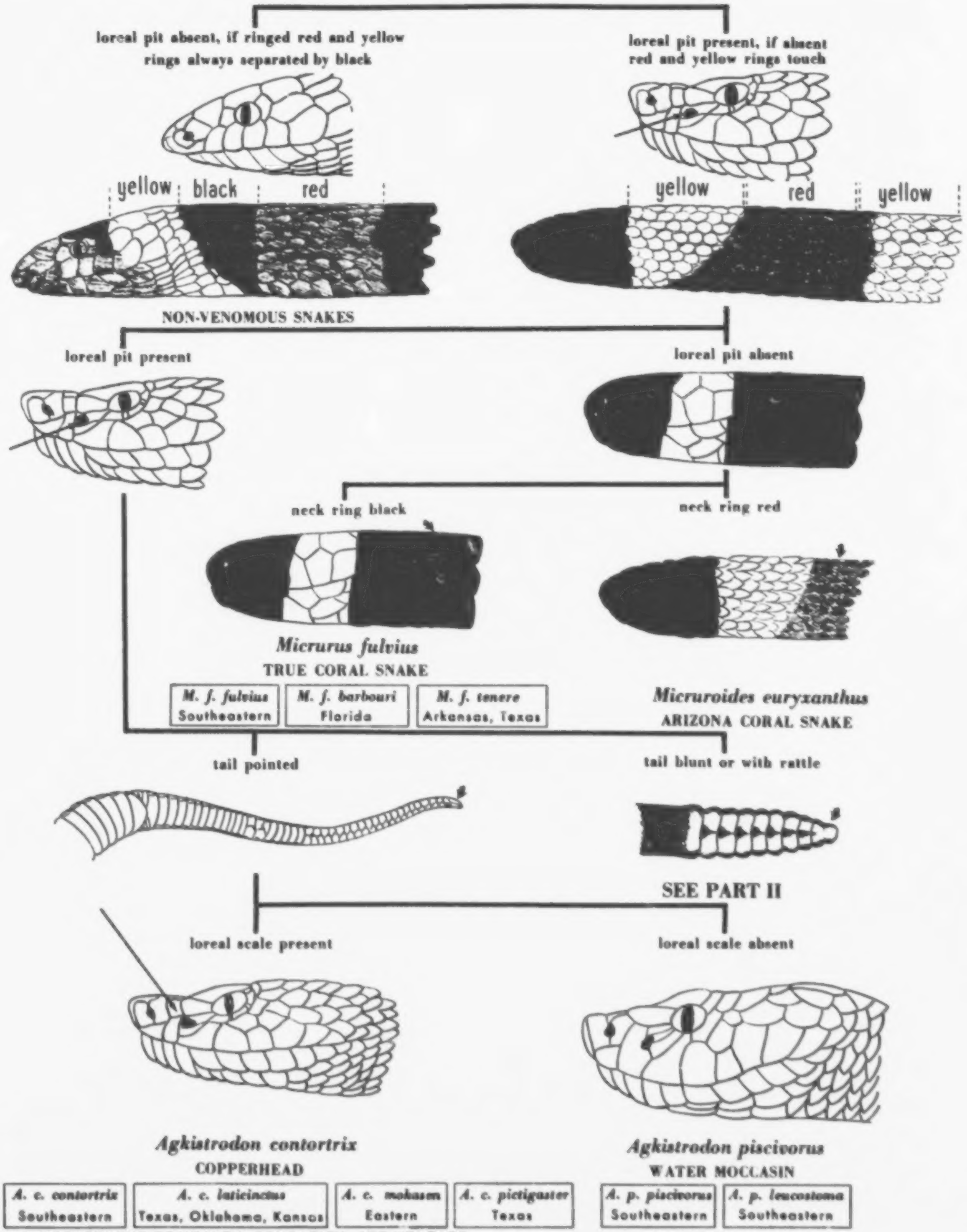


Fig. 9 D

SNAKES: PICTORIAL KEY TO VENOMOUS SPECIES IN UNITED STATES

PART I

Chester J. Stojanovich and Margaret A. Parsons


loreal pit absent, if ringed red and yellow rings always separated by black
loreal pit present, if absent red and yellow rings touch
yellow
black
red
yellow
red
yellow
NON-VENOMOUS SNAKES
loreal pit present
loreal pit absent
neck ring black
neck ring red
Micrurus fulvius
TRUE CORAL SNAKE
M. f. fulvius
Southeastern
M. f. barbouri
Florida
M. f. tenere
Arkansas, Texas
Micruroides euryxanthus
ARIZONA CORAL SNAKE
tail pointed
tail blunt or with rattle
SEE PART II
loreal scale present
loreal scale absent
Agkistrodon contortrix
COPPERHEAD
A. c. contortrix
Southeastern
A. c. laticinctus
Texas, Oklahoma, Kansas
A. c. mokasen
Eastern
A. c. pictigaster
Texas
Agkistrodon piscivorus
WATER MOCCASIN
A. p. piscivorus
Southeastern
A. p. leucostoma
Southeastern

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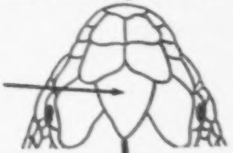
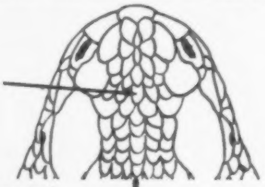
PART II

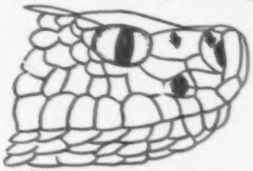
head with large scales medially



head with small scales medially



upper preocular usually touching postnasal

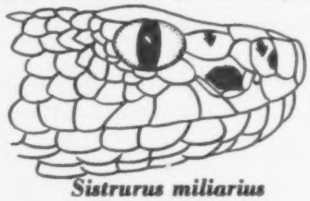


Sistrurus catenatus
MASSASAUGA RATTLESNAKE

S. c. catenatus	*S. c. edwardsii*
Great Lakes & Central U.S.	Arizona, Colorado, New Mexico, Texas

S. c. tergeminus
Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Texas

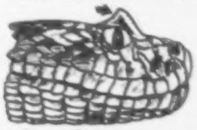
upper preocular and postnasal separated



Sistrurus miliarius
PIGMY RATTLESNAKE

S. m. miliarius	*S. m. barbouri*	*S. m. streckeri*
Southeastern	Southeastern	Southeastern

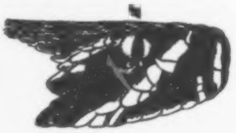
supraocular scale modified into a hornlike ridge



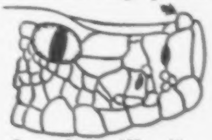
Crotalus cerastes
SIDEWINDER RATTLESNAKE

C. c. cerastes	*C. c. cercobombus*	*C. c. laterorepens*
Arizona, California, Nevada, Utah	Arizona	Arizona, California

supraocular scale not modified into a hornlike ridge



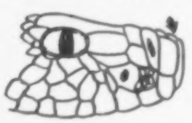
internasal ridge present



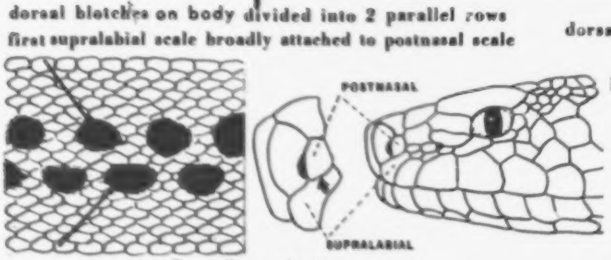
Crotalus willardi
RIDGE-NOSED RATTLESNAKE

C. w. silus	*C. w. willardi*
New Mexico	Arizona,

internasal ridge absent

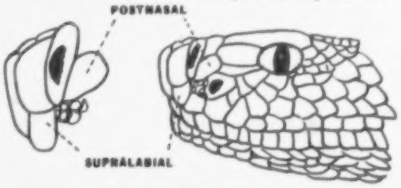


dorsal blotches on body divided into 2 parallel rows
first supralabial scale broadly attached to postnasal scale



Crotalus pricei
TWIN-SPOTTED RATTLESNAKE Arizona

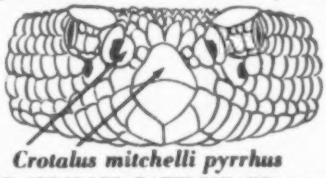
dorsal blotches on body not divided into 2 parallel rows
first supralabial scale not broadly attached to
postnasal scale, sometimes completely separated



SEE PART III

PART III

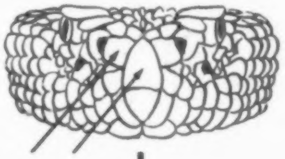
prenasal and rostral usually separated



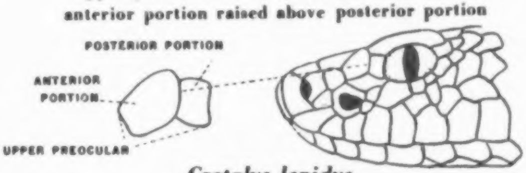
Crotalus mitchelli pyrrhus

SOUTHWESTERN SPECKLED RATTLESNAKE Arizona, California, Nevada, Utah

prenasal and rostral attached



upper preocular usually separated vertically, anterior portion raised above posterior portion



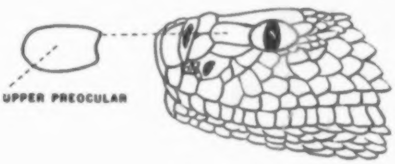
Crotalus lepidus

ROCK RATTLESNAKE

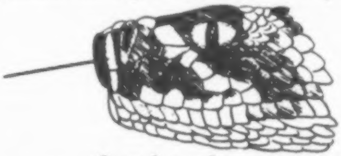
C. l. lepidus
New Mexico, Texas

C. l. klauberi
Arizona, New Mexico, Texas

upper preocular usually not separated, if separated anterior portion not raised above posterior portion



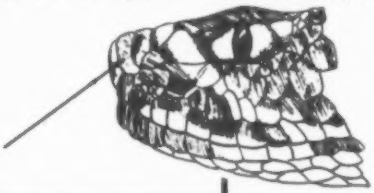
prenasal and supralabial scales with pale stripe



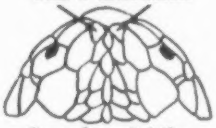
Crotalus adamanteus

EASTERN DIAMONDBACK RATTLESNAKE Southeastern

prenasal and supralabial scales without pale stripe



with 2 internasals



Crotalus viridis

WESTERN RATTLESNAKE

C. v. viridis
West Central U.S.

C. v. abyssus
Arizona

C. v. cerberus
Arizona

C. v. concolor
Colorado, Utah

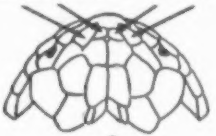
C. v. helleri
California

C. v. lutosus
Nevada & adjoining states

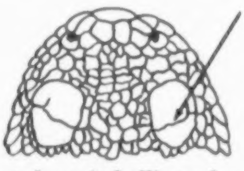
C. v. nuntius
Arizona

C. v. oreganus
California, Idaho, Oregon, Washington

with more than 2 internasals



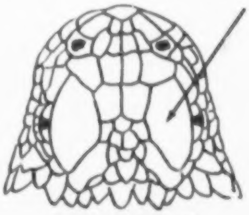
supraocular scale divided, pitted or margins uneven



Crotalus mitchelli stephensi

PANAMINT RATTLESNAKE California, Nevada

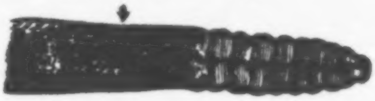
supraocular scale not divided, pitted or margins uneven



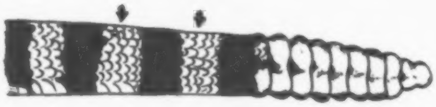
SEE PART IV

PART IV

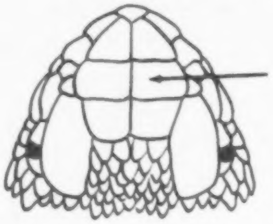
tail without distinct rings



tail with distinct rings



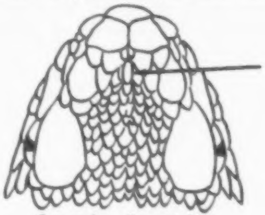
anterior frontal area with large scales



Crotalus molossus

BLACK-TAILED RATTLESNAKE Southwestern

anterior frontal area with scales not much larger than posterior scales

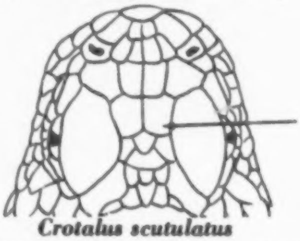


Crotalus horridus

CANEBRAKE OR TIMBER RATTLESNAKE

C. h. horridus Eastern	*C. h. atricaudatus* Southeastern

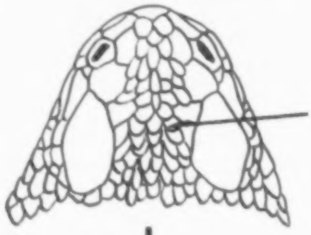
scales between supraoculars usually 2



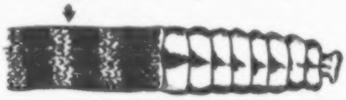
Crotalus scutulatus

MOHAVE RATTLESNAKE Arizona, California, Nevada, New Mexico, Texas

scales between supraoculars usually 4, or more



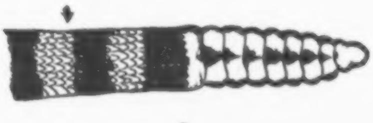
tail not in sharp contrast to posterior part of body



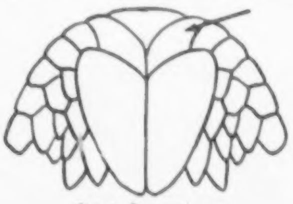
Crotalus tigris

TIGER RATTLESNAKE Arizona

tail in sharp contrast to posterior part of body



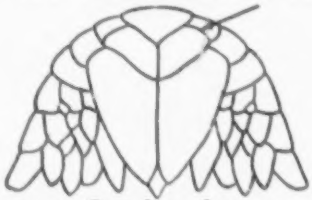
first infralabial scale rarely divided, body color grayish



Crotalus atrox

WESTERN DIAMONDBACK RATTLESNAKE Southwestern

first infralabial scale usually divided, body color pink or red

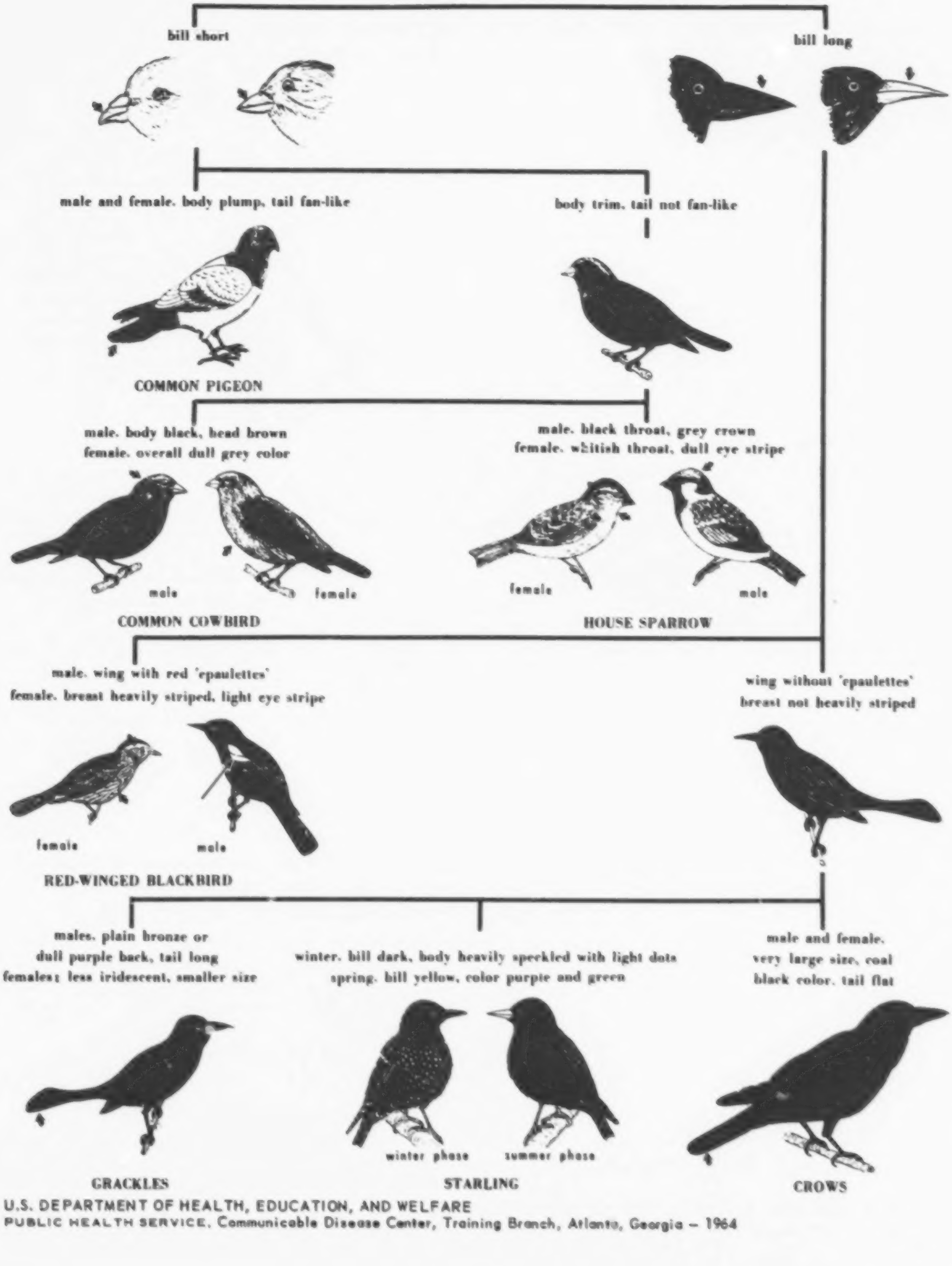


Crotalus ruber

RED DIAMONDBACK RATTLESNAKE California

BIRDS: PICTORIAL KEY TO SOME COMMON PEST SPECIES OF PUBLIC HEALTH IMPORTANCE

Margaret A. Parsons and Chester J. Stojanovich

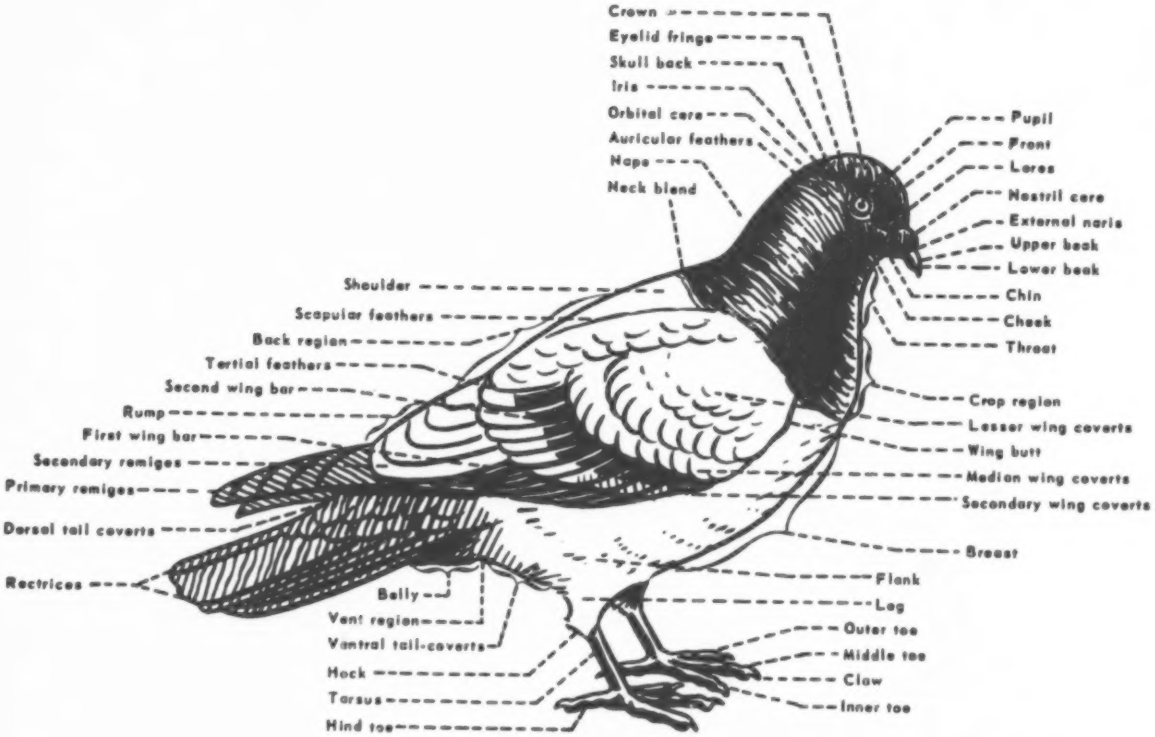

bill short
bill long
male and female. body plump, tail fan-like
body trim. tail not fan-like
COMMON PIGEON
male. body black, head brown
female. overall dull grey color
male. black throat, grey crown
female. whitish throat, dull eye stripe
male
female
COMMON COWBIRD
female
male
HOUSE SPARROW
male. wing with red 'epaulettes'
female. breast heavily striped, light eye stripe
wing without 'epaulettes'
breast not heavily striped
female
male
RED-WINGED BLACKBIRD
males. plain bronze or
dull purple back, tail long
females: less iridescent, smaller size
winter. bill dark, body heavily speckled with light dots
spring. bill yellow, color purple and green
male and female.
very large size, coal
black color. tail flat
winter phase
summer phase
GRACKLES
STARLING
CROWS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964

PIGEON, COLUMBA LIVIA – EXTERNAL MORPHOLOGY

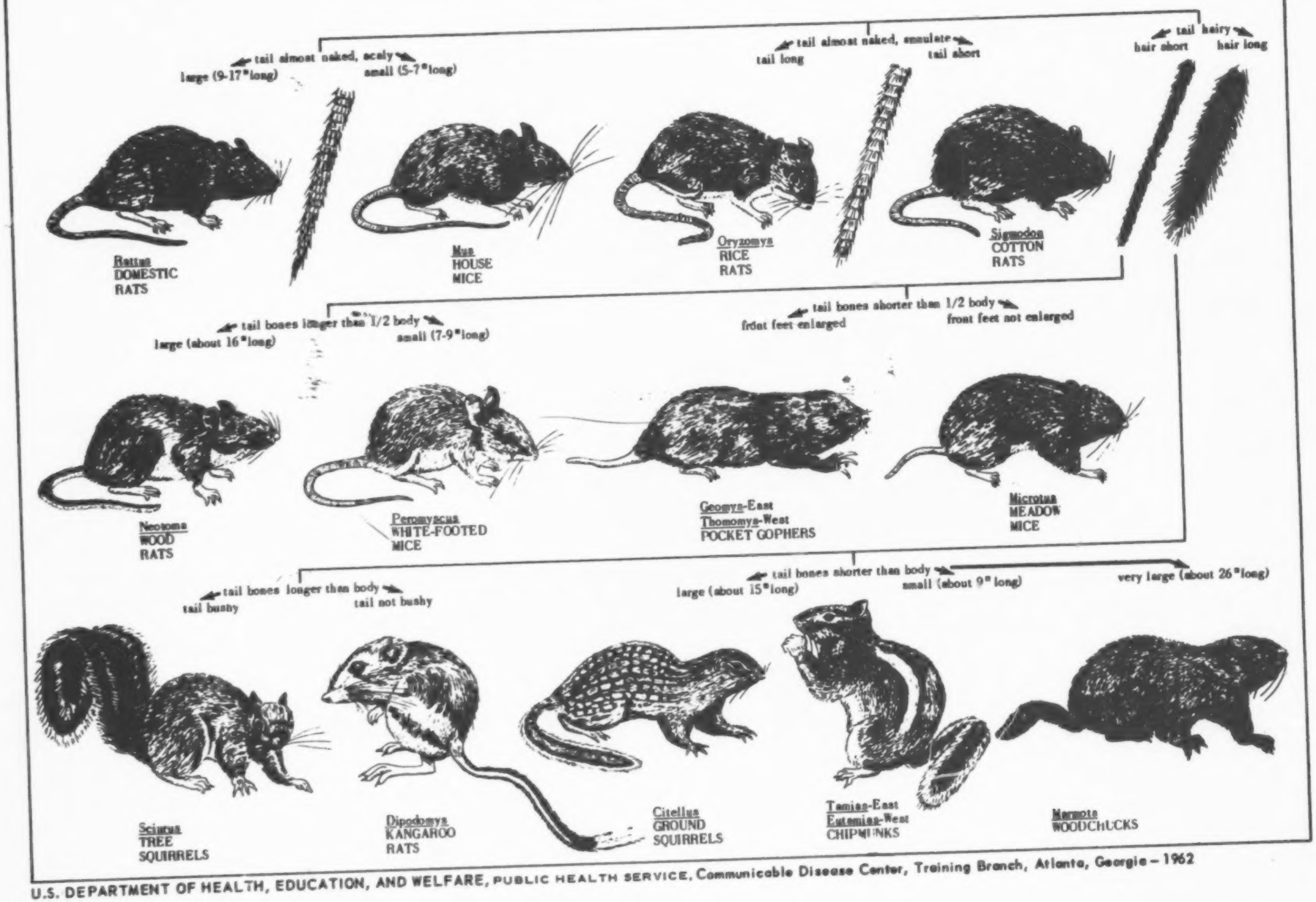
Harold George Scott and Walter S. Dougherty


Crown
Eyelid fringe
Skull back
Iris
Orbital cere
Auricular feathers
Nape
Neck blend
Pupil
Front
Lores
Nostril cere
External naris
Upper beak
Lower beak
Chin
Cheek
Throat
Shoulder
Scapular feathers
Back region
Tertial feathers
Second wing bar
Rump
First wing bar
Secondary remiges
Primary remiges
Dorsal tail coverts
Rectrices
Crop region
Lesser wing coverts
Wing butt
Median wing coverts
Secondary wing coverts
Breast
Flank
Leg
Belly
Vent region
Ventral tail-coverts
Hock
Tarsus
Hind toe
Outer toe
Middle toe
Claw
Inner toe

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia

RODENTS: PICTORIAL KEY TO SOME COMMON UNITED STATES GENERA

Harold George Scott and Margery R. Borom


tail almost naked, scaly
large (9-17"long)
small (5-7"long)
tail almost naked, annulate
tail long
tail short
tail hairy
hair short
hair long
Rattus DOMESTIC RATS
Mus HOUSE MICE
Oryzomys RICE RATS
Sigmodon COTTON RATS
tail bones longer than 1/2 body
large (about 16"long)
small (7-9"long)
tail bones shorter than 1/2 body
front feet enlarged
front feet not enlarged
Neotoma WOOD RATS
Peromyscus WHITE-FOOTED MICE
Geomys-East Thomomys-West POCKET GOPHERS
Microtus MEADOW MICE
tail bones longer than body
tail bushy
tail not bushy
tail bones shorter than body
large (about 15"long)
small (about 9" long)
very large (about 26"long)
Sciurus TREE SQUIRRELS
Dipodomys KANGAROO RATS
Citellus GROUND SQUIRRELS
Tamias-East Eutamias-West CHIPMUNKS
Marmota WOODCHUCKS

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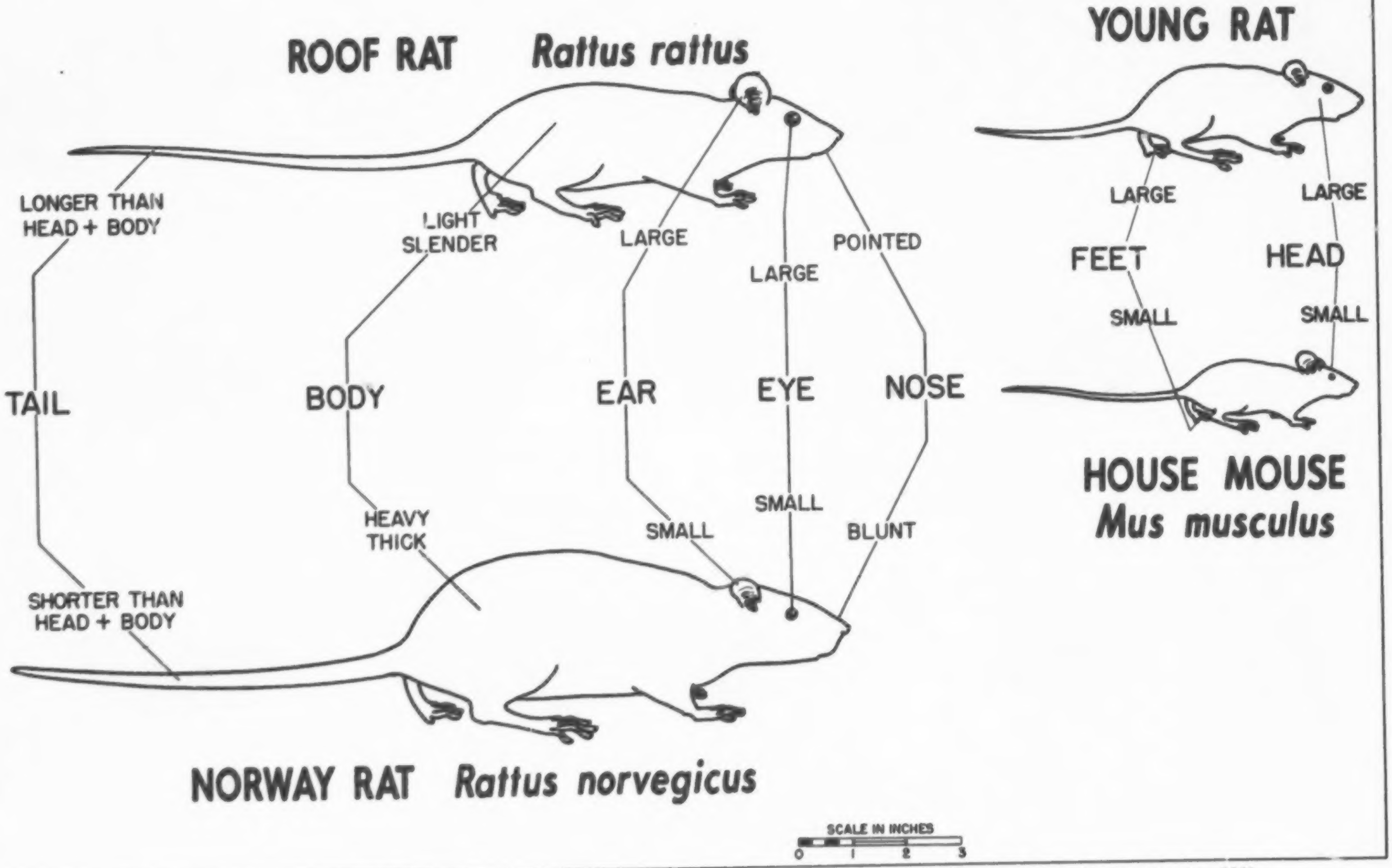
DOMESTIC RODENT FIELD IDENTIFICATION

Robert Z. Brown


ROOF RAT Rattus rattus
YOUNG RAT
LONGER THAN HEAD + BODY
LIGHT SLENDER
LARGE
LARGE
POINTED
LARGE
LARGE
FEET
HEAD
SMALL
SMALL
TAIL
BODY
EAR
EYE
NOSE
HOUSE MOUSE Mus musculus
HEAVY THICK
SMALL
SMALL
BLUNT
SHORTER THAN HEAD + BODY
NORWAY RAT Rattus norvegicus
SCALE IN INCHES
0
1
2
3

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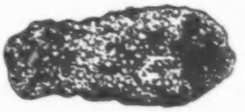
DOMESTIC RODENTS AND COCKROACHES: PICTORIAL KEY TO DROPPINGS

Harold George Scott and Margery R. Borom

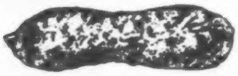
length over 1/3-inch*

rectangular, blunt



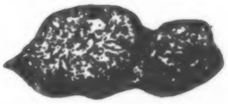
Rattus norvegicus
NORWAY RAT

elongate, pointed



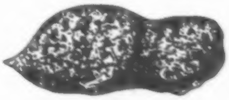
Rattus rattus
ROOF RAT

length under 1/4-inch*



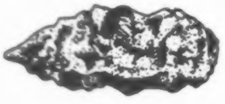
elongate, pointed

without ridges
length about 1/4-inch



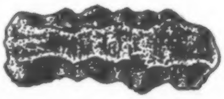
Mus musculus
HOUSE MOUSE

with ridges
length about 1/16-inch

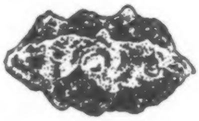


Blatella germanica
GERMAN COCKROACH

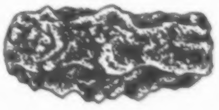
rectangular, blunt
with ridges



ovoid, pointed
with ridges

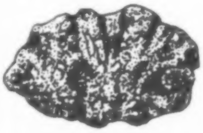


length about 1/8-inch



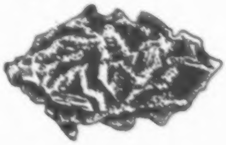
Periplaneta americana
AMERICAN COCKROACH

length about 1/16-inch



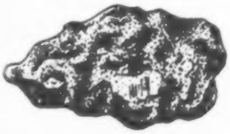
Blatta orientalis — ORIENTAL COCKROACH or
Periplaneta fuliginosa — SMOKY BROWN COCKROACH

length about 1/8-inch



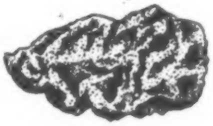
Periplaneta australasiae
AUSTRALIAN COCKROACH

length about 1/16-inch



Periplaneta brunnea
BROWN COCKROACH

length about 1/32-inch



Supella supellectilium
BROWN-BANDED COCKROACH

*All characteristics for average, dry, adult droppings. Study groups, not individual droppings.

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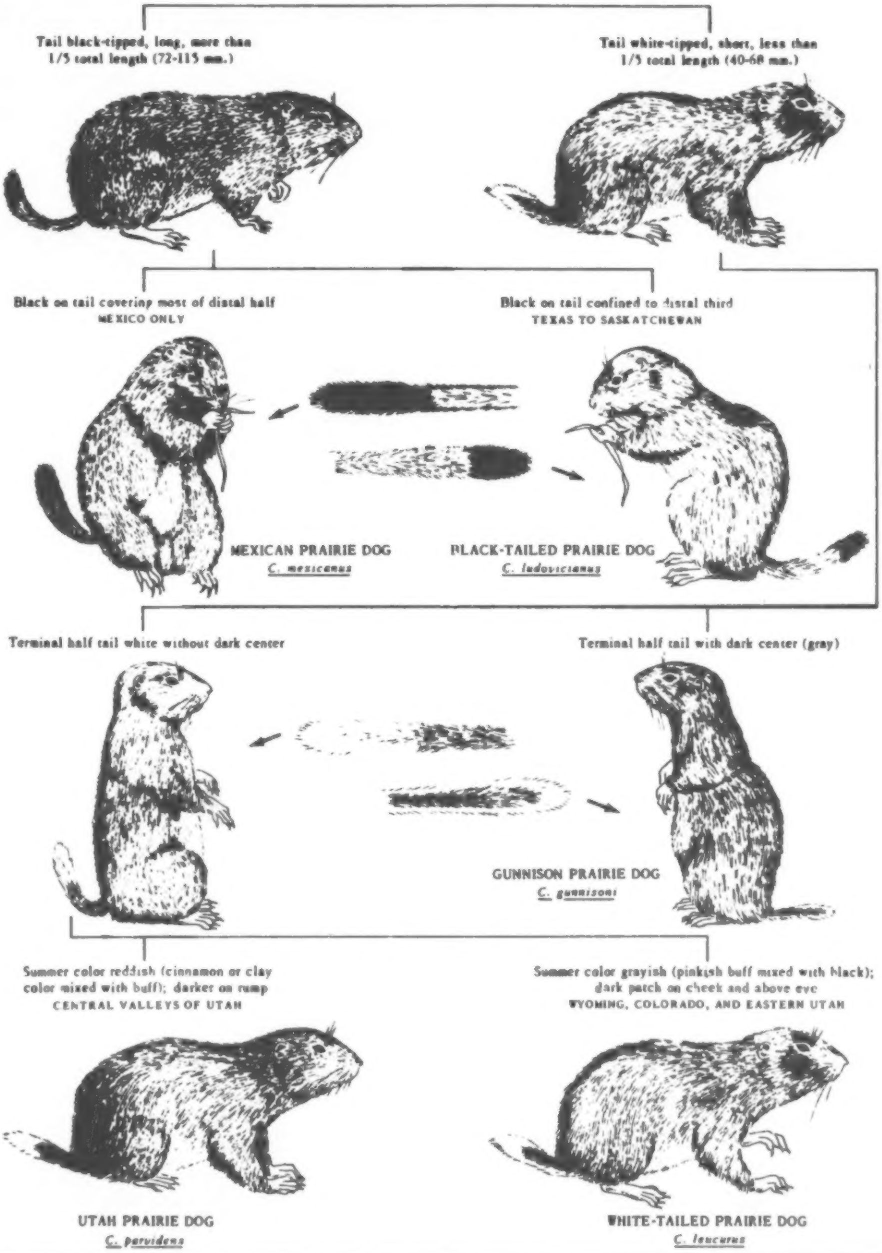
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1964

PRAIRIE DOGS: PICTORIAL KEY TO COMMON NORTH AMERICAN SPECIES

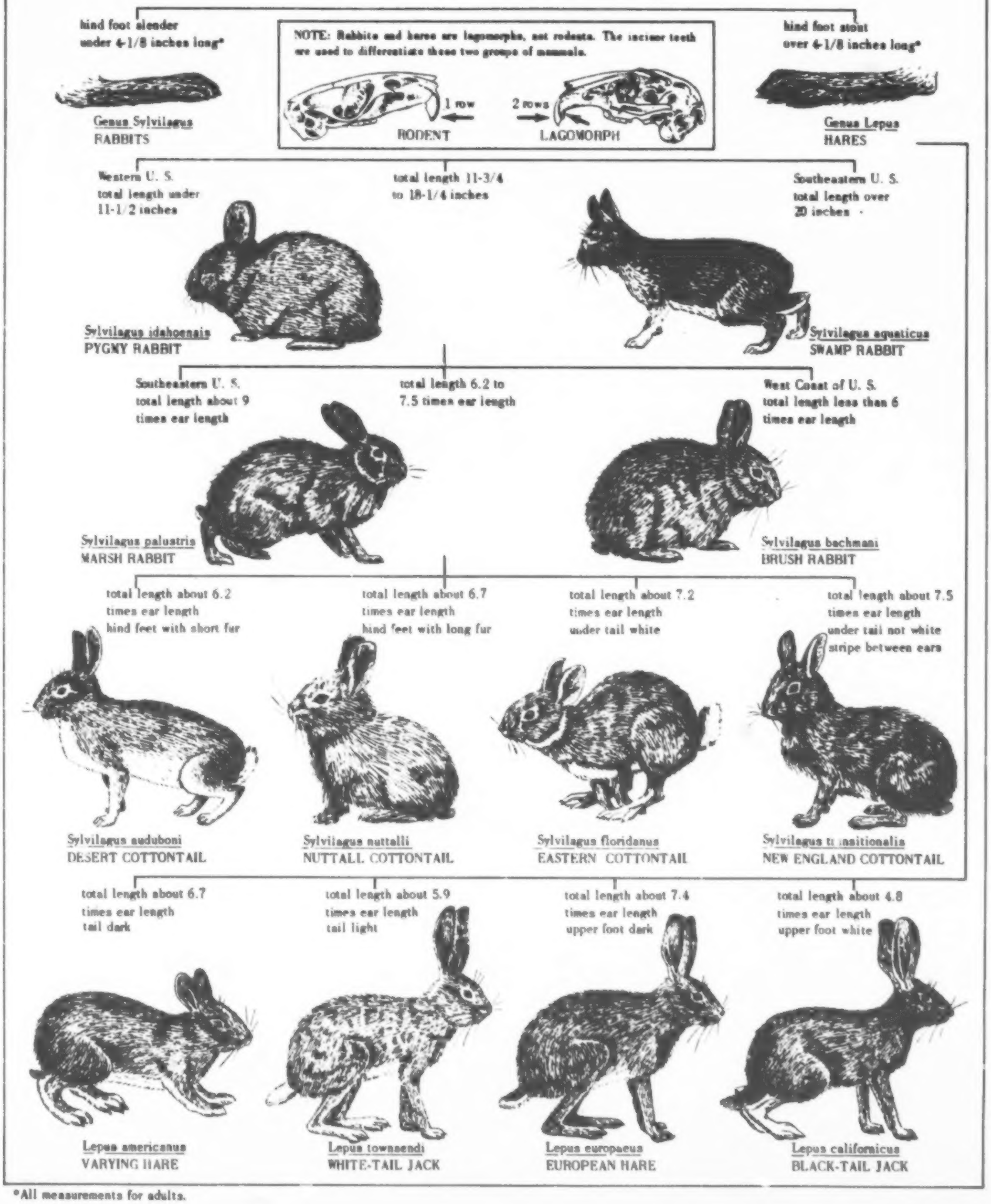
(Cynomys)

Harry Weinburgh and Margery R. Borom


Tail black-tipped, long, more than
1/5 total length (72-115 mm.)
Tail white-tipped, short, less than
1/5 total length (40-60 mm.)
Black on tail covering most of distal half
MEXICO ONLY
Black on tail confined to distal third
TEXAS TO SASKATCHEWAN
MEXICAN PRAIRIE DOG
C. mexicanus
BLACK-TAILED PRAIRIE DOG
C. ludovicianus
Terminal half tail white without dark center
Terminal half tail with dark center (gray)
GUNNISON PRAIRIE DOG
C. gunnisoni
Summer color reddish (cinnamon or clay color mixed with buff); darker on rump
CENTRAL VALLEYS OF UTAH
Summer color grayish (pinkish buff mixed with black); dark patch on cheek and above eye
WYOMING, COLORADO, AND EASTERN UTAH
UTAH PRAIRIE DOG
C. parvidens
WHITE-TAILED PRAIRIE DOG
C. leucurus

RABBITS AND HARES: PICTORIAL KEY TO COMMON UNITED STATES SPECIES

Harold George Scott and Margery R. Borom

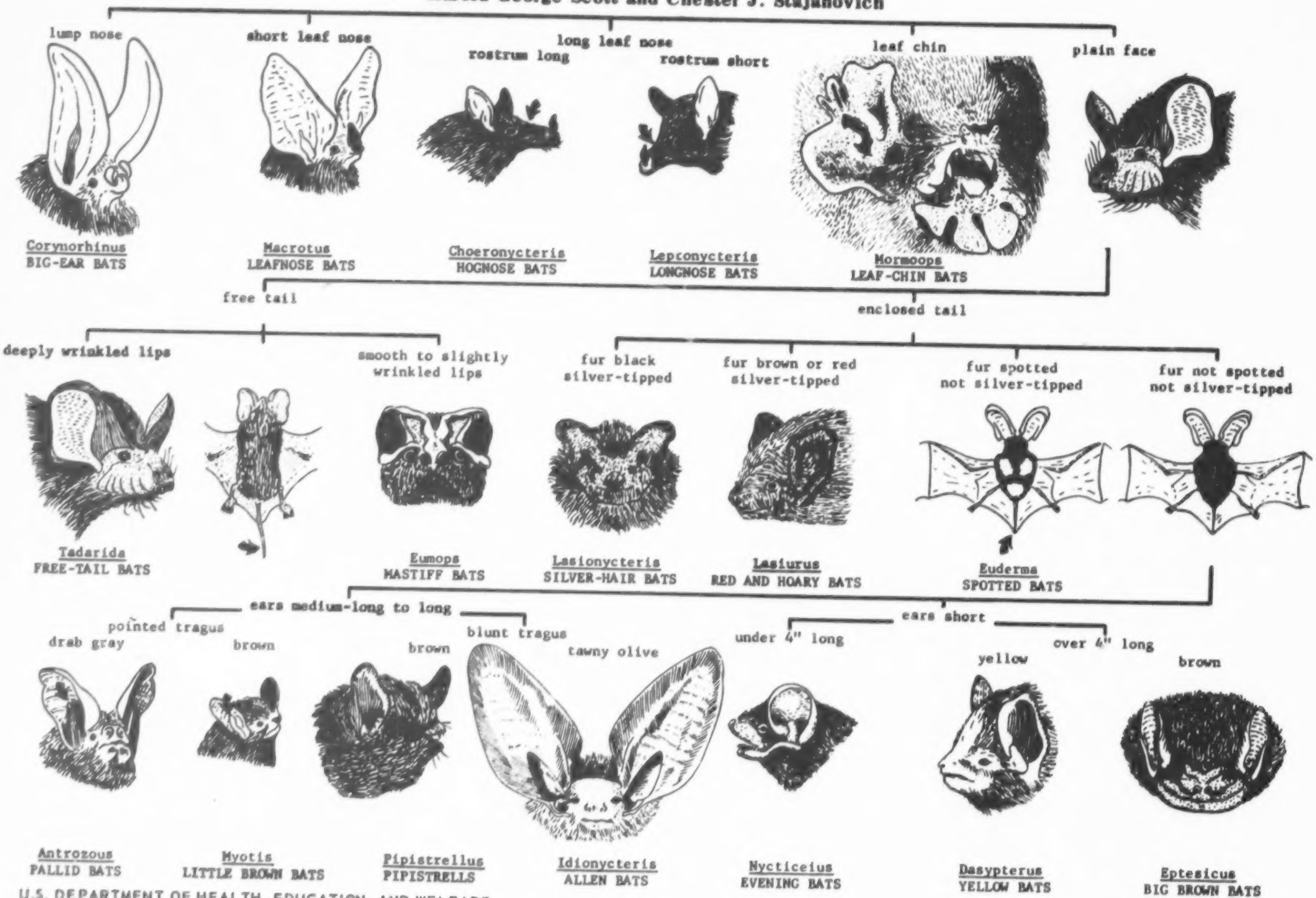

hind foot slender
under 4-1/8 inches long*
NOTE: Rabbits and hares are lagomorphs, not rodents. The incisor teeth are used to differentiate these two groups of mammals.
1 row
RODENT
2 rows
LAGOMORPH
hind foot stout
over 4-1/8 inches long*
Genus Sylvilagus
RABBITS
Genus Lepus
HARES
Western U. S.
total length under
11-1/2 inches
total length 11-3/4
to 18-1/4 inches
Southeastern U. S.
total length over
20 inches
Sylvilagus idahoensis
PYGMY RABBIT
Sylvilagus aquaticus
SWAMP RABBIT
Southeastern U. S.
total length about 9
times ear length
total length 6.2 to
7.5 times ear length
West Coast of U. S.
total length less than 6
times ear length
Sylvilagus palustris
MARSH RABBIT
Sylvilagus bachmani
BRUSH RABBIT
total length about 6.2
times ear length
hind feet with short fur
total length about 6.7
times ear length
hind feet with long fur
total length about 7.2
times ear length
under tail white
total length about 7.5
times ear length
under tail not white
stripe between ears
Sylvilagus auduboni
DESERT COTTONTAIL
Sylvilagus nuttalli
NUTTALL COTTONTAIL
Sylvilagus floridanus
EASTERN COTTONTAIL
Sylvilagus transitionalis
NEW ENGLAND COTTONTAIL
total length about 6.7
times ear length
tail dark
total length about 5.9
times ear length
tail light
total length about 7.4
times ear length
upper foot dark
total length about 4.8
times ear length
upper foot white
Lepus americanus
VARYING HARE
Lepus townsendi
WHITE-TAIL JACK
Lepus europaeus
EUROPEAN HARE
Lepus californicus
BLACK-TAIL JACK

*All measurements for adults.

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1962

BATS: PICTORIAL KEY TO UNITED STATES GENERA

Harold George Scott and Chester J. Stajanovich


lump nose
short leaf nose
long leaf nose
rostrum long
rostrum short
leaf chin
plain face
Corynorhinus
BIG-EAR BATS
Macrotus
LEAFNOSE BATS
Choeronycteris
HOGNOSE BATS
Leptonycteris
LONGNOSE BATS
Mormoops
LEAF-CHIN BATS
free tail
enclosed tail
deeply wrinkled lips
smooth to slightly wrinkled lips
fur black silver-tipped
fur brown or red silver-tipped
fur spotted not silver-tipped
fur not spotted not silver-tipped
Tadarida
FREE-TAIL BATS
Eumops
MASTIFF BATS
Lasionycteris
SILVER-HAIR BATS
Lasiurus
RED AND HOARY BATS
Euderma
SPOTTED BATS
ears medium-long to long
ears short
pointed tragus
blunt tragus
under 4" long
over 4" long
drab gray
brown
brown
tawny olive
yellow
brown
Antrozous
PALLID BATS
Myotis
LITTLE BROWN BATS
Pipistrellus
PIPISTRELLS
Idionycteris
ALLEN BATS
Nycticeius
EVENING BATS
Dasypterus
YELLOW BATS
Eptesicus
BIG BROWN BATS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE, Communicable Disease Center, Training Branch, Atlanta, Georgia – 1960 – Revised 1962

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